

Flight, August 6, 1910.

FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

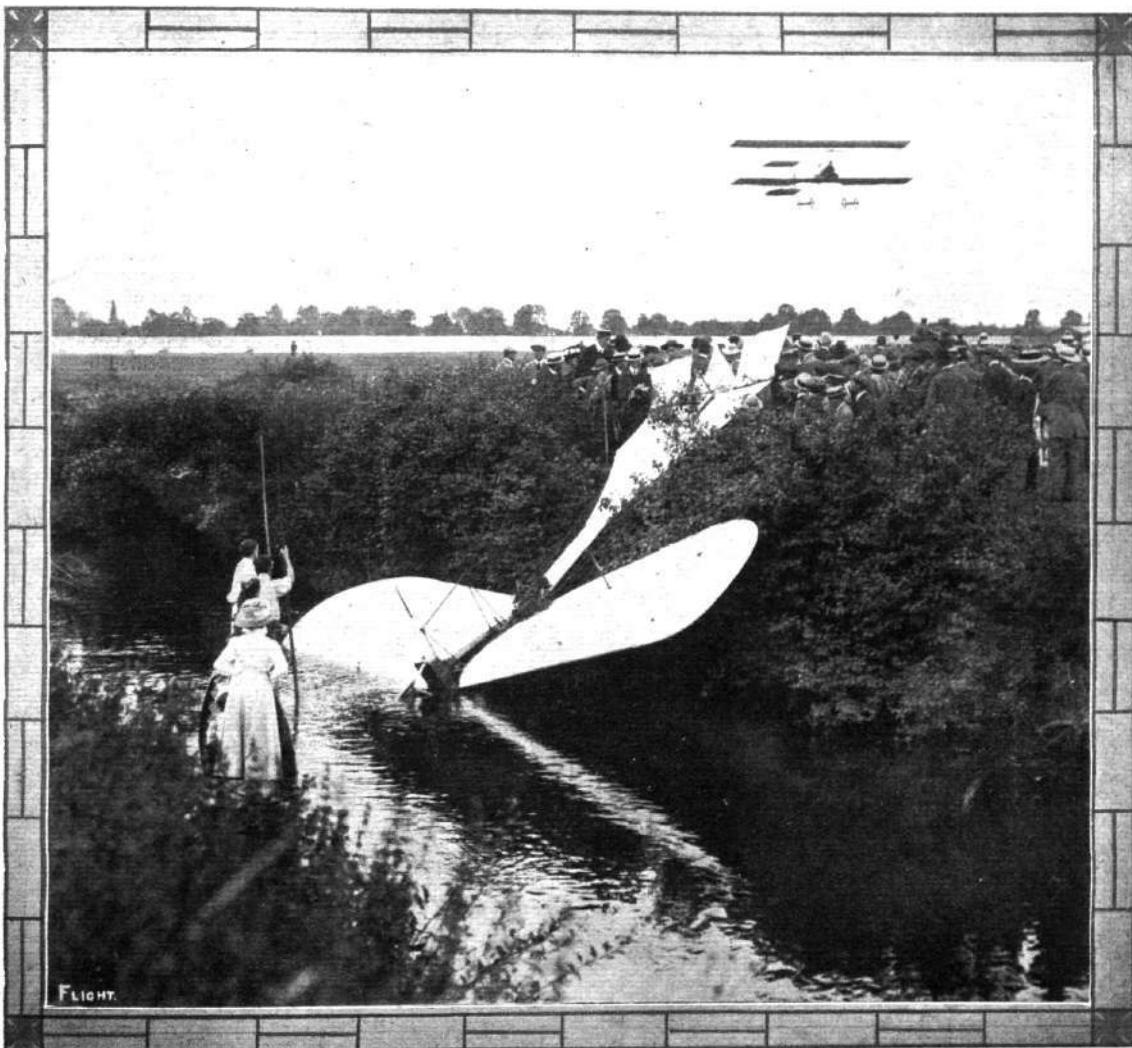
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CORDONNIER'S MISHAP AT BROOKLANDS ON BANK HOLIDAY.—His Hanriot monoplane on the bank of the River Wey after his sudden descent. Overhead Blondeau is in full flight on his Henry Farman. Note the punting party ready to assist if necessary.

ACCIDENTS AND THEIR EFFECT.

SINCE the one or two fatal accidents in connection with flight which have marred recent meetings in England have brought home to the public that aviation cannot, any more than any other science, be developed without the element of personal risk bulking rather largely in the process, an outcry on the part of the more mawkish and sensational portion of the Press has been witnessed—to which we have already given some amount of attention—protesting against the continuation of a movement which, so we are told, merely panders to the morbid tastes of the crowd. Most people who attend flying meetings do so, it is alleged, for the same reason that they go to lion-taming exhibitions—with the pious hope, that is, that on the occasion of their visit to this particular menagerie, the lions may develop a lust for blood, and turn upon the trainer. The same feeling is detected by a few jelly-backed scribes, who promptly endeavour to persuade the world at large that anything tending to demonstrate the survival of some virility in the race is immoral and wrong. Therefore, on the ground that these displays pander to the perverted tastes of the morbidly-minded, flight meetings should be discountenanced by every means possible. In order that the argument may not appear to be too mawkishly sentimental, the readers are generally taken into the confidence of the particular writer who happens to be preaching the true gospel for the time being, and are told that aviation meetings are promoted by callous persons whose sole idea is to make money out of them, while the unfortunate flying men themselves are encouraged to risk almost certain death for filthy lucre. Briefly that seems to be the standpoint from which is written a great deal of the twaddle which has disfigured the columns of certain of the dailies of late. It is a pity that those who are responsible for conducting them do not look at things with a better perspective, and do not trouble to arrive at a more correct idea of the proportion of things before they circulate expressions of opinion which are, to put it quite mildly, badly distorted.

In dealing with this matter of accidents to flying men, it is of course first necessary for advocates of progress to satisfy themselves that some useful end is to be attained by the development of the science of flight. Is it necessary? Is it desirable to proceed with its development? Even supposing that, for the sake of argument, the answer to the first query were in the negative—of course, it is impossible to admit anything of the kind—it is quite impossible to return a negative reply to the second. Flight is with us, and will remain. Success in its development here in Great Britain may mean, one of these days, all the difference to the nation. Therefore it is most desirable—nay, essential—to leave no stone unturned, no effort unmade, that can help along that development which must come, if not from within, at the hands of international rivals. Now in the course of that development accidents, some of them involving loss of life, must inevitably occur. The threshold of knowledge has even yet only just been reached, great though the progress of the past year or two has been. It is only possible to arrive at the end of knowledge through the process of "trial and error" by which all mechanical knowledge has been attained, and in course of which much valuable human life has been sacrificed. The history of flight must follow the same course, and the inevitable must be looked in the face. Much has been made of the effect on the public mind of accidents

occurring at open meetings, and the moral has been drawn that these public shows are therefore to be deprecated. That, we take leave to think, is entirely a fallacious way of looking at the matter. As we have pointed out on innumerable occasions, accidents are inevitable from time to time, and we maintain that it is better that these things should happen in public than in private. The reason is simple. An aviator meets with a serious accident while practising in private. What has been learnt as a result? Absolutely nothing in the generality of cases. No one was there to see and mark the cause, and to pass on the knowledge of why the thing happened, so that similar unfortunate eventualities may be guarded against in the future. Others still remain groping in the dark, as it were, until something of the kind happens again under more favourable circumstances for observation, and thus gives the needed clue to the cause. The obvious deduction to be drawn from this is that if accidents *must* happen—and there is no earthly reason for blinking the fact that they must—it is far better that they should occur in public than in private, for in the former case they happen under the eyes of observers, many of whom are experts, and therefore able to arrive at a proper conclusion as to the whys and wherefores of the case.

Another point mentioned above in connection with the sentimental outcry against flight is that of the financial aspect of the open meeting. We are ourselves entirely against the promiscuous promotion of aviation meetings by all and sundry, regardless of whether ground, management, or competitors are suitable or competent. The fitness of all should be certified by the Royal Aero Club or some other competent body before any meeting whatsoever should be sanctioned. That, however, is by the way. The main point is that under proper supervision and given a suitable ground there can be no possible or valid objection to the meeting with money prizes. It must be borne in mind that, in the first place, aviation at this stage is a terribly expensive pursuit, and the pioneers must be helped financially in one way or another. Possibly in another country it would be found possible to carry on the work of development by the aid of Government subventions. That is not possible in this country, and consequently other sources have to be looked to for providing the necessary funds. The proper way of looking at the matter, to our way of thinking, is that on the one hand the aviators themselves are supplying the skill and knowledge for the development of the science, while those who provide the prize money are simply financing the progress of the movement. It may be true enough that the motives of the latter class are not altogether disinterested, and that they look to recouping themselves for their outlay, and even to making a profit out of flight, but it is impossible to have it both ways. The Government shows little disposition to help, though it is ready enough to take advantage of progress registered; private philanthropy is at a discount; and it is obviously impossible—even if it were desirable—that the pioneers should be asked to provide funds for what is after all a national concern, as well as to run the incidental personal risks. Again, all our leading aviators are in the game for the pure love of it, while some actually attend the meetings which are the subject of condemnation *in spite of* and not because of the money prizes.

BLACKPOOL FLYING CARNIVAL.

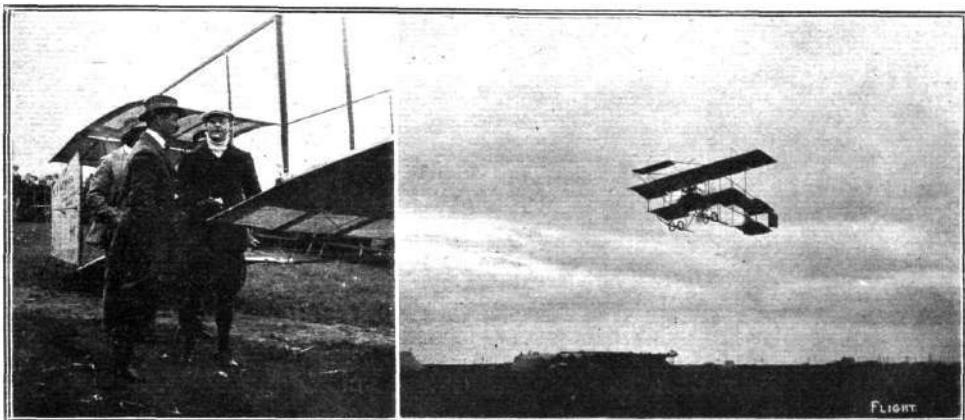
JULY 28TH TO AUGUST 20TH.

By OUR SPECIAL COMMISSIONER.

Thursday, July 28th.

THE flying carnival at Blackpool opened with a state of unpreparedness in a measure difficult to account for altogether. The majority of the hangars were, firstly, not ready to receive the machines when they arrived, their construction having been delayed owing to the heavy rain during the two days prior to the

to 2 p.m., and competitive flights from 2 p.m. to 8 p.m. The enclosure containing the hangars is separate from the aerodrome, and a charge of 1s. is made for the inspection of the machines. When the public were admitted to this enclosure on the opening day, the only machines on view were three Blériots, two belonging to Grahame-White and the other to Cecil Grace. Mr. Grahame-White



THE FIRST MAN UP AT BLACKPOOL FLYING CARNIVAL.—Robert Loraine circles the aerodrome on his Henry Farman Saturday afternoon last. On the left, McArdele and Loraine are discussing the prospects of being able to give some exhibitions on the day before, Friday.

opening. Again, difficulties had also been encountered in the transportation of the machines, and this, combined with the unfortunate destruction by fire of A. V. Roe's two triplanes, gave one the impression that very little flying, if any, would take place on the opening day, and so it proved to be. The daily programme consists of two parts, viz., inspection of the aeroplanes from 10 a.m.

arrived from Torbay about 12 o'clock, and as two of his Blériots were assembled, the possibility of a flight increased, but nothing matured. At 2 o'clock the weather, which had been showery and dull with a fairly strong breeze, improved, the sun coming out and giving promise of more settled conditions. Under such auspices the turnstiles admitting to the flying ground were soon busy, and about



Grahame-White, on his Henry Farman, just rising from the sands on the South Shore, Blackpool, on Sunday afternoon last, to which point he flew from the Aerodrome in order to visit the Lancashire Aero Club.



FLIGHT.

McArdle, on Grahame-White's Blériot, just before starting on Saturday for the Altitude Prize at Blackpool Aerodrome.

5,000 people were on the ground by half-past two. These relieved the tedium of waiting by discussing the aviators, their machines and performances, and the possibility of flights being made. After waiting until half-past five, the crowd stormed the barriers and rushed across the course into the hangar enclosure to investigate for themselves the reason of their disappointment. After some little trouble and discussion, it was announced by Mr. Harry Delacombe that the entrance money would be returned to those who produced railway tickets, and pass-out tickets admitting those staying in the neighbourhood to the ground on the following day. This closed an incident which at one time seemed likely to end seriously.

In the hangars, mechanics were unloading Chavez's Blériot, Loraine's Farman and Harding's J.A.P. At 6 p.m. the Farman machine which Grahame-White piloted over the Fleet at Torbay the previous evening arrived on the ground, and, aided by eight assistants, he proceeded to assemble the machine in the presence of those people still waiting hopefully for some flying. Some time afterwards Grace's machine was wheeled out of the hangar and the engine started up. After running the engine for about ten minutes the machine was taken back again owing to some of the cylinders not firing. The interest was now centred in Grahame-White, and he was cheered very heartily when he mounted and started off across the enclosure to the flying ground, with the whole crowd in immediate attendance, Press, police, and people racing behind and at the side of the machine. Entering the flying ground Grahame-White travelled on the ground for about a quarter of a mile and then turned against the wind, rising from the ground almost immediately, to the great gratification of the assembled crowd. The flight started at 7.39 p.m., which left only twenty-one minutes for flight before the end of the official day. After circling the aerodrome a few times, the aviator steered out into the country over St. Annes. The distant murmur of people cheering, heard on the flying ground, told us all was going well with him. On descending at 8.12 p.m. he was vociferously cheered by the crowd. This flight by Grahame-White is remarkable, inasmuch as the machine was assembled in an hour and three-quarters, and was the same machine which had piloted over the fleet at Torbay only twenty-eight hours previously. Both the transporting and assembling of the machine in such times are surely records difficult to beat.

It is worth recapitulating the prizes offered for the competition and the conditions attached. Each day two prizes of £100 and £50 are offered for the greatest total time of flying, not less than twenty and fifteen minutes being necessary to qualify for first and second prizes. A daily prize of £50 is offered for the greatest altitude, the minimum height being 200 ft. In addition, a daily prize is offered

for the most meritorious performance of the day. For this day's work, Grahame-White got away with the prizes for the greatest totalisation and for general merit.

Friday, July 29th.

The weather on Friday was ideal from a holiday-maker's point of view, but the wind was too strong for safe flying. After the fiasco of the previous day, prominent notices had been placed at the turnstiles to the effect that flying would take place if possible, but was not guaranteed, and no money would be returned. In spite of this, a fairly large crowd gathered on the ground. Late in the afternoon, when the prospects of flying seemed small, the crowd were allowed to inspect the machines and were greatly interested in the motors which were being tested near the hangars. Drexel's passenger-carrying Blériot and McArdle's Blériot arrived during the course of the afternoon. Loraine's racing Farman machine was brought out at six o'clock, and the announcement was made that he would make an attempt in half an hour. The wind, however, increased in force, and flight became out of the question, Friday thereby proving a blank day.

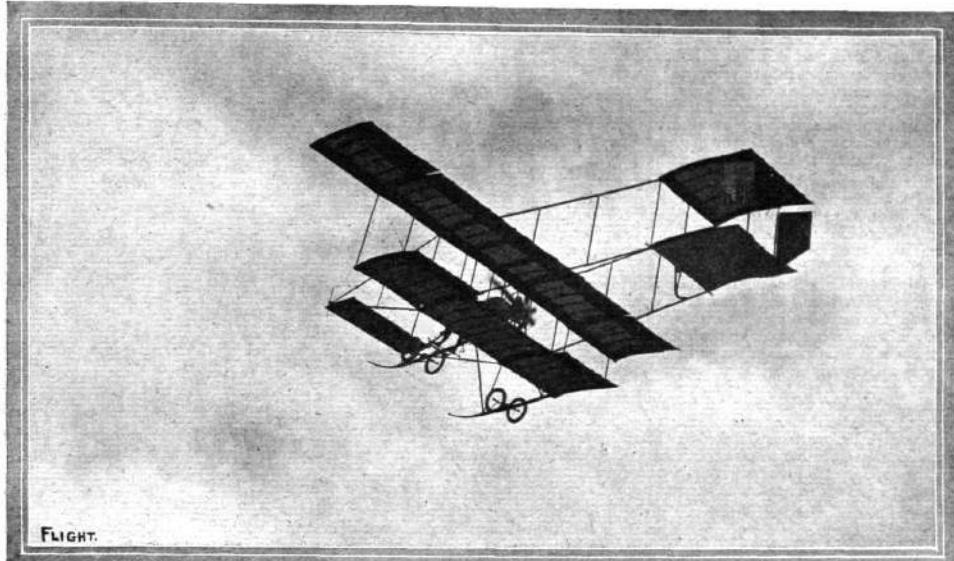
Saturday, July 30th.

The meeting on Saturday was opened by Loraine, who started off at 3.30 p.m. in a treacherous wind. After making one or two circuits of the course with great difficulty he came down in a field just beyond the flying ground. He was followed immediately by Grahame-White, who, finding the wind troublesome, came down in the hangar enclosure. Forty minutes later Grahame-White made an attempt for the altitude prize, this being registered by a small recording aneroid barometer. Although the wind was blowing strongly, the aviator went out over St. Annes, and then back again over the aerodrome. After a quarter of an hour's flight, he planed down to the flying ground. On consulting the barometer the height was announced as 1,310 ft., but this was afterwards revised to 825 ft. Grahame-White was soon out again, this time with his pupil Mr. Gresswell as passenger, and succeeded in making a fine flight, ascending to a height of five or six hundred feet. In the meantime McArdle had made arrangements to fly on Grahame-White's Blériot, and announced his intention of going for the height prize. Starting at six o'clock, McArdle rose rapidly, but seemed to be in difficulties with the strong currents of wind, as his circuits took him farther and farther away from the aerodrome, and he finally landed about two miles away. As his position was uncertain, Grahame-White went in search of him and succeeded in



FLIGHT.

Harding in the pilot's seat of his J.A.P. monoplane at Blackpool.



FLIGHT.

Robert Loraine's start from Blackpool grounds for his splendid and unrehearsed trip to Liverpool and back on Monday.

locating him, returning with the news that no damage had been done. Whilst Grahame-White was away, Drexel made an attempt for the height prize on Cecil Grace's Blériot. His flight was watched with the greatest interest and apprehension, as it was apparent that something was wrong with the machine as soon as he rose. The machine oscillated dangerously, and fears were expressed for the safety of the aviator. After rising to a height of over 600 ft., Drexel came down a little, and then made a sudden *vol plane*, recovering about 50 ft. from the ground and bringing the machine gracefully to earth. On alighting, Drexel, Grace, and Chereau, Blériot's manager, were in consultation on the behaviour of the machine, and found that the bracing wires on the framework were slack, allowing the tail to twist relatively to the main plane. For this exhibition of skill and daring Drexel was rightly awarded the daily merit prize of £100.

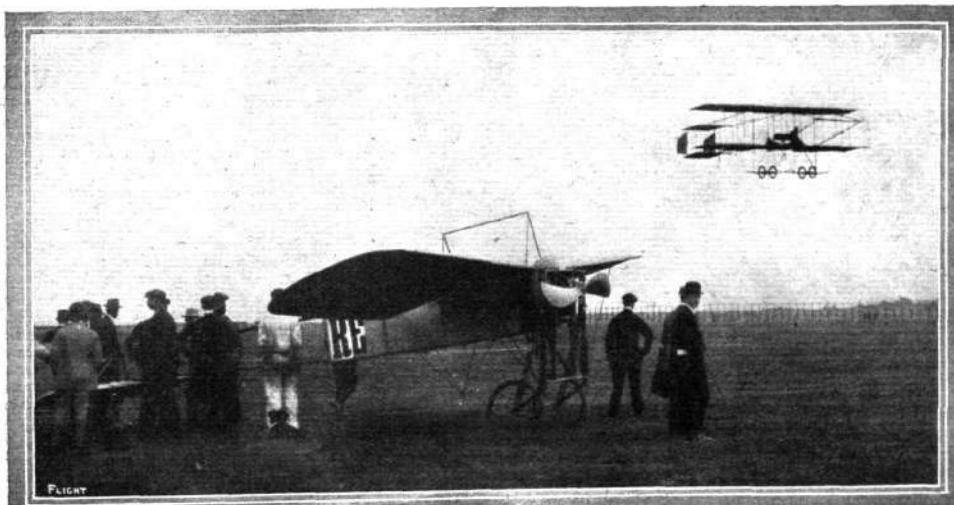
Later on in the evening McArdle's Blériot was wheeled back to the hangar.

Sunday, July 31st.

Although no official programme had been arranged for Sunday, the hangar enclosure was opened for the inspection of the aeroplanes. Late in the afternoon Grahame-White decided to make a surprise flight, and went off in the direction of Blackpool, along the sands to the Tower, then round over the sea, and back again to the Victoria Pier, alighting on the sands in front of the Lancashire Aero Club, which he entered. Returning a few minutes later, he found his machine surrounded by thousands of enthusiasts, who gave him a very fine reception. Aided by the police, sufficient space was cleared to enable him to rise again, and he returned to the aerodrome none the worse for his novel flight.

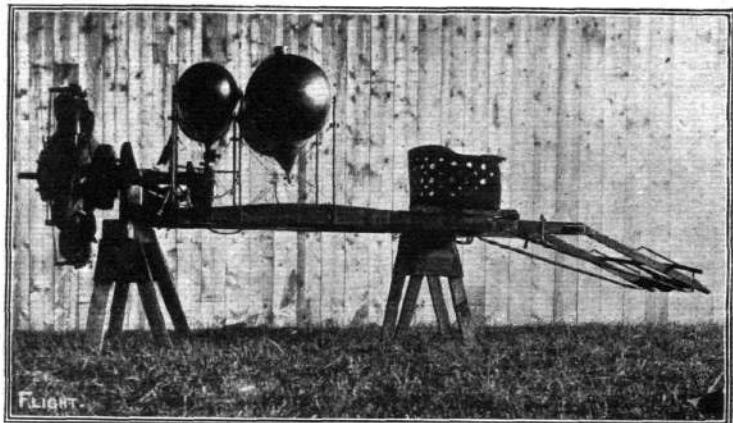
Monday, August 1st.

Bank Holiday opened gloriously fine with every prospect of a full day's flight, a prospect which events justified. As early as 11 o'clock



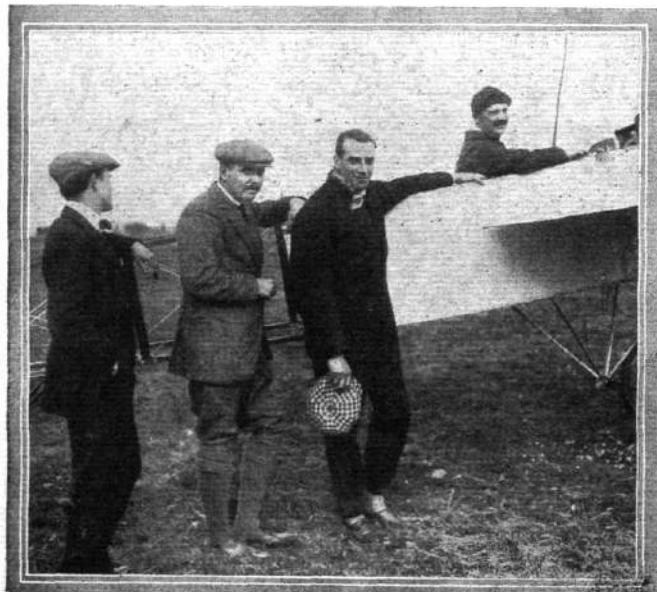
GRAHAME-WHITE IN FLIGHT ON HIS HENRY FARMAN AT BLACKPOOL AERODROME.—The machine at rest on the ground is Cecil Grace's Blériot.

the well-known Henry Farman machine of Grahame-White was in the aerodrome, and shortly afterwards the aviator set out with the intention of flying to Southport, involving a flight across the Ribble estuary, the distance from town to town being 12 miles. He arrived there safely to the great jubilation of the holiday crowds assembled on the sands, and after spending about an hour in Southport, made the return journey in about 15 minutes, landing in the aerodrome shortly after 1 o'clock. Meanwhile there was no lack of interest in the aerodrome. Gresswell, a pupil of Grahame-White, came out on the "Bluebird," a cross-Channel type of Blériot, with the fabric painted blue, and fitted with a three-cylinder Anzani engine. After amusing the assembled spectators with ground manoeuvres and several hops, he essayed a more serious attempt, when, in getting up speed, his steering proved faulty, one of the wheels buckling, with the result that the "Bluebird" came down on one wing with disastrous effect. The pilot was in no way the worse for his accident, and managed to preserve the calm so necessary for the successful aviator. McArdle was next out on his Blériot, flying in a series of undulations, giving one the impression of an invisible switchback. During his flight, which lasted 10 minutes, he ascended to a considerable height, and then, switching off his ignition, began a *vol plane*. When nearing the ground, however, McArdle apparently warped the wrong wing, with the result that he buckled the left wheel and suspension fork, besides damaging the framework carrying the motor, the wings, and smashing the propeller. The announcement was now made that Drexel would take Grace as a passenger and fly round the Blackpool Tower in the two-seated Blériot which Drexel purchased from Morane at the close of the recent Bournemouth meeting. In conveying the machine across the hangar enclosure one of the tyres burst, and the flight was postponed, being finally abandoned. By this time the news of the fine flying had become known all over the town, and huge crowds entered the aerodrome in anticipation of further excitement. The sandhills immediately adjoining the ground were black with people, and quite a hundred thousand people took advantage of the opportunity of witnessing



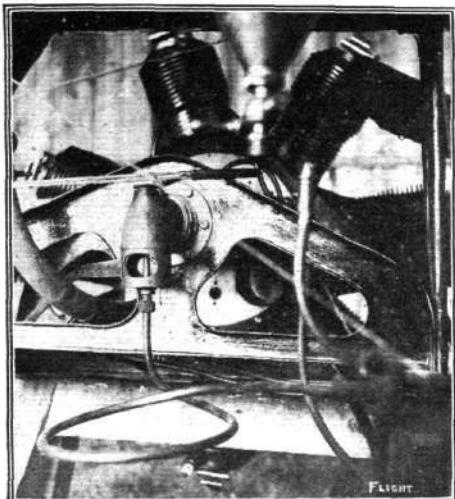
A Gnome motor "set" for Henry Farman biplane, showing engine, propeller, oil and petrol tanks, pilot's seat, and foot control of vertical rudders.

the flying from such advantageous positions. Chavez made his first appearance with his Blériot at 2.30 p.m., and rising rapidly, delighted the crowd with a superb and masterly exhibition of airmanship, his machine growing smaller and smaller until the hum of the motor was almost imperceptible. In descending, Chavez made a series of magnificent glides, bringing the machine to earth in a graceful swoop. On referring to the recording barometer, the maximum height registered 1,200 metres, but this did not count for the altitude prize as he was not over the aerodrome. The official height was given as 2,550 ft., quite sufficient to secure him the altitude prize. After Chavez came Drexel and Grace on the two-seater Blériot. Drexel proceeded to execute various manoeuvres in the air, turning in a very small circle, but flying very low. It was soon apparent that the engine was not pulling at all well, and after barely clearing the fencing of the enclosure, Drexel brought the machine to earth in a field outside the ground. Loraine and the racing Farman became visible at 3 p.m., but no start was made until 3.15 p.m., owing to one of the wheel hubs seizing on its spindle. A fresh wheel being substituted, Loraine started, and having made a circuit of the aerodrome went off in the direction of Lytham. Various suggestions were made as to his ultimate goal, but it was not until quarter past four that he was located, when a telephone message from Liverpool brought the news that he was flying over that city. A few minutes later we heard that he was rounding New Brighton town, and on his way back. Meanwhile Grace brought out his new Blériot, and as this was his maiden attempt on the machine his flight was followed with great interest. He rose nicely, and for 8 minutes travelled over the aerodrome and sandhills, making a most successful landing. Some time later, in making another attempt, he got into difficulties with the steering, and, veering round suddenly, buckled the wheel, with the result that the aeroplane tilted over on one wing, and the propeller smashed. The cause of the smash was due to Grace's inability to locate the switch, and he was in the unfortunate position of being in charge of a runaway aeroplane. Chavez now went up for the duration prize, and as is his custom, rose rapidly to about 2,000 ft., flying out over the sea and the neighbouring district. Whilst Chavez was still flying Grahame-White ascended, and the two aviators made a pretty spectacle. Grahame-White proceeded to qualify for the merit prize by a series of intricate displays, cutting figure eights with ease, certainty, and grace. Tetard, the Sommer pilot, was next in evidence, making his first flight in splendid style, and creating no little discussion amongst the spectators as to the machine and its pilot. Although roughly built, the machine showed itself to be a very capable flyer. Shortly afterwards Tetard rose again, and attaining an altitude of over 1,000 ft., headed over Blackpool, rounding



Four of the great flyers at Blackpool. From left to right—Cecil Grace, Armstrong Drexel, Claude Grahame-White, and, in the Blériot pilot's seat, McArdle.

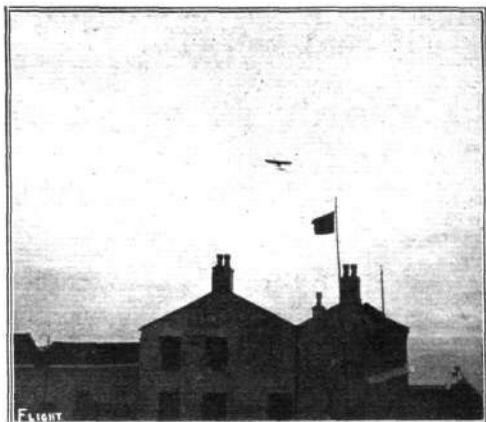
the Tower and returning to the aerodrome, where he spent some time in steady flying. Considerable surprise and excitement was caused by the appearance of A. V. Roe with a new triplane, which had been hurriedly built up of such spars as



Rear view of Gnome motor on Henry Farman machine, showing carburettor with air inlet and throttle control, position of magneto, petrol tank, and oil feed tube.

were available. This machine was only put in hand on the Thursday morning previous, and the greatest praise is due to Mr. Roe and his staff for the excellent workmanship embodied in the machine. Roe succeeded in flying four circuits of the course, and then came down, breaking two struts attached to the skid. Owing to tyre troubles only one tyre was fitted, three of the wheels running on the rims, and in landing the machine came down heavily on the skids, breaking the rubber bands supporting the wheels and the two struts. Roe received the congratulations of the other aviators, and was awarded a special merit prize of £50 for his performance. Meanwhile Grahame-White was busy taking passengers up, the majority being ladies, and the trips lasting about ten minutes each. Téard went up again for the duration prize, flying over the surrounding country, but always in sight of the aerodrome. Just before 7 o'clock a biplane was seen

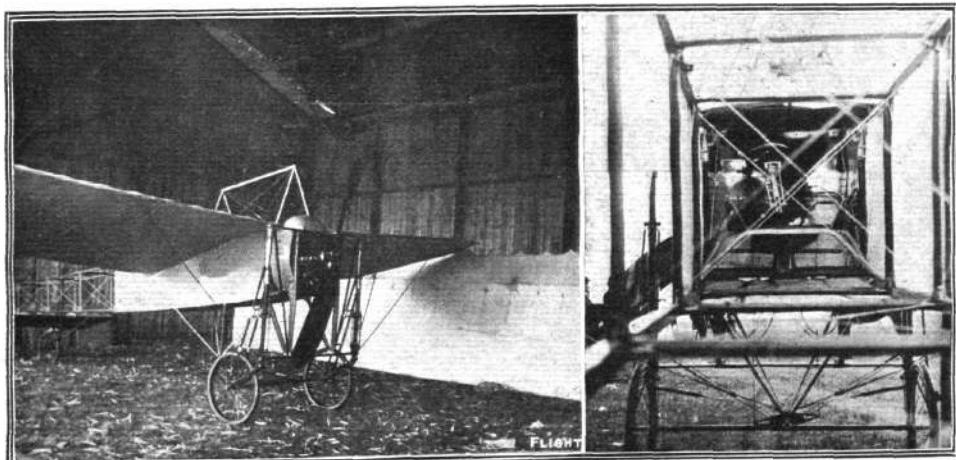
travelling over St. Anne's, and this proved to be the missing Loraine and his Farman. Hearty cheers greeted his landing in the aerodrome. It appears that after leaving New Brighton he had trouble with the lower plane of the tail. The oil from the motor had saturated the fabric, and this bellied upwards, reducing the lift of the tail so much that Loraine decided to come down, and landed on a sandbank at Fairhaven at 5.5 p.m., 6 miles away from the aerodrome. With the aid of Captain Smart and the mechanics the fabric was riveted



Drexel on Cecil Grace's Blériot flying over the Club-house on Saturday last at the Blackpool meeting. For this achievement he was awarded the Daily Merit Prize of £100.

down again, and the flight resumed at 6.45 p.m. It would be difficult to over-estimate the importance of this cross-country flight, and it must certainly be classed amongst the finest examples of such we have had in this country. As this flight did not count for the duration prize, the petrol tank was filled up again, and Loraine started off round the aerodrome, he and Téard providing some very pretty flying. Whilst Loraine and Téard were in the air, Grahame-White went off with a passenger over Blackpool, circling the Tower *en route*. Having trouble with his engine he alighted on the North Shore golf links, and, after dropping his passenger there, succeeded in making his way to the aerodrome, flying over the promenade, and arriving back at 8.20 p.m. Thus ended a day of flying which has seldom been equalled in the history—certainly not in Great Britain—of flight.

The awards were as follows:—



GRAHAME-WHITE'S BLÉRIOT, SHOWING THE CENTRAL ARRANGEMENTS.—On the right, a view taken from the tail end shows the pilot's seat, control pillar and wheel, warping arrangement and metal splash-board to protect the aviator from oil.

AUGUST 6, 1910.

£100 Duration Prize to Tetard, time 1h. 59m. 25s.
 £50 Duration Prize to Lorraine, time 42 mins. 56 secs.
 £50 Altitude Prize to Chavez, height 2,550 ft.
 £100 Merit Prize to Grahame-White.
 £50 Special Merit Prize to A. V. Roe.
 The official number for attendance was 24,000.

Tuesday, August 2nd.

Tuesday proved wet and windy, with little prospect of flying, although the weather seemed likely to improve at noon. The wind was blowing from 20 to 30 miles per hour, and the aerodrome was deserted. In the hangars the damaged machines were being re-



LANARK INTERNATIONAL FLIGHT MEETING.

THERE is every indication that the second International flying meeting to be held this year in Great Britain, which opens on Monday next, will be the most important meeting so far held in these Islands. As we announced last week twenty-one entries have been accepted, and the organisers have done everything in their power to ensure the safety and comfort both of the spectators and the competitors. The entries are :-

Audemars.	S. F. Cody.	G. Gilmour.	Morelle.
Blondeau.	G. C. Colmore.	C. Grace.	A. Ogilvie.
Cattaneo.	Capt. B. Dickson.	Hanriot.	J. Radley.
Champel.	J. A. Drexel.	J. Harding.	Tetard.
Chavez.	L. D. Gibbs.	Kuller.	Vidart.
G. B. Cockburn.			

It will be seen from the above that the "field" will be a very representative one, the monoplanes including machines of the Blériot, Teller, Hanriot, Antoinette, J.A.P. makes, while the biplanes will include those of the Henry Farman, Short-Wright, Short, Voisin, Sommer types. It is possible that Morane may visit Lanark as well as M. Blériot himself, while Svendson, who recently flew from Denmark to Sweden, may also be present.

Flying will commence at 12 noon each day, and continue to sunset, and it is expected that several records will go by the board. Details of the daily programme will be found on page 622 under the Royal Aero Club notices. The Committee have decided not to have an alighting competition, and they have also drawn up some regulations with a view to preventing accidents by reason of the competitors passing each other too closely. One rule, for instance, says that "bearing in mind that flights round the circle take place in the opposite direction to that in which the hands of a clock travel, a competitor shall only pass on the outside (that is, on the right) of the competitor to be passed. On no consideration whatever shall the faster travelling or overtaking machine be allowed to pass on the inside. The overtaking pilot shall be held responsible for the clearing of the overtaken competitor, and must, after having

paired and the others overhauled. The wind maintained its strength throughout the afternoon, with every sign of becoming worse. At 7.30 p.m. Roe brought his triplane out, and made several attempts to get up, but with the exception of one or two long hops nothing resulted. A few minutes later Grahame-White came into the aerodrome, and, in spite of the fast rising wind, made several circuits of the course. This was the finest exhibition of skill the meeting has yet produced, as the machine rocked and pitched in response to the violent gusts which assailed it. Against the wind progress was extremely slow, the machine lifting itself higher into the air as each gust struck it, whilst with the wind a speed of 70 miles per hour was maintained. With Grahame-White's descent the day's proceedings closed.



passed, keep at such a distance from the latter (whether outside, above, below, or in front, that the overtaken competitor shall have undisturbed air in which to travel. The clerks of the course will be the sole judges as to whether these regulations have been complied with."

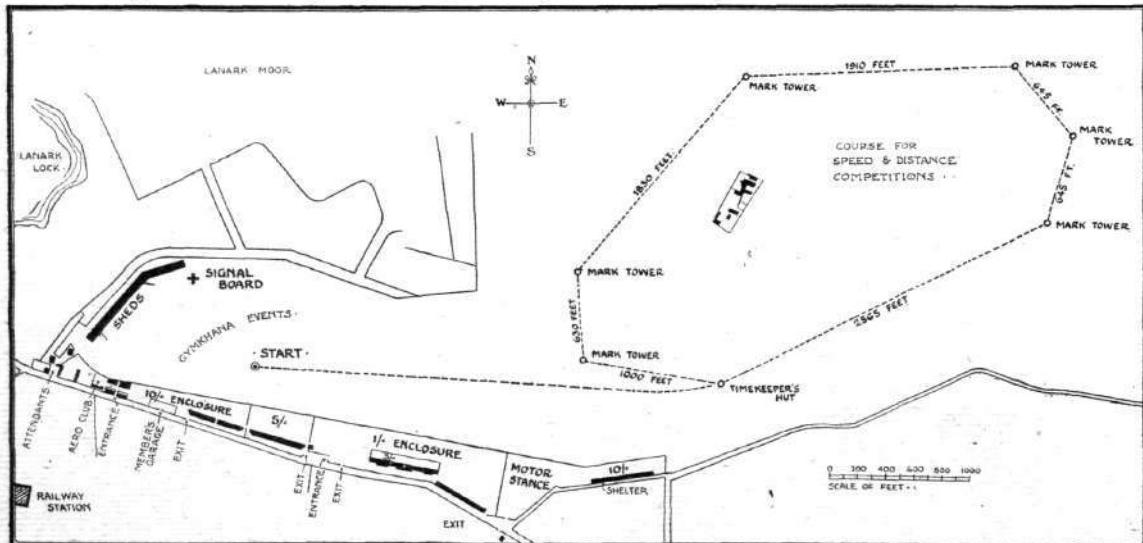
For the convenience of visitors to the flying ground, a new station has been built adjoining the racecourse, where there will be facilities for dealing with 30,000 passengers a day. Of course, special arrangements have been made for the accommodation of motorists, and, in view of the likelihood of the road traffic being very heavy the police and the Aviation Committee strongly urge that all long-distance traffic will refrain from approaching the enclosures *via* Lanark, and feel sure that any extra distance involved in approaching from the east *via* Hyndford Bridge will be more than compensated by a saving in time and by a more comfortable and less congested access. The aerodrome is on the Lanark-Carlisle road, about one mile south-east of Lanark.

Cars from Edinburgh should go *via* Carlops, West Linton, Biggar, and Hyndford Bridge. The direct road from Carslairs and Carnwath to Hyndford Bridge will be closed during the meeting. Cars from Glasgow should go *via* Hamilton or Strathaven and Lesmahagow by the Carlisle road to Douglas Mill, and thence to Hyndford Bridge. The motor enclosure is at the extreme end of the course farthest away from Lanark. The Control Agents of the Scottish A.C. will be on duty on the roads leading to Lanark and the aerodrome during the meeting.

Members and Associates of the Scottish Aeronautical Society, the Royal Aero Club, and affiliated societies will be admitted to the Members' Reserved Enclosure at the following prices:-Daily, 2s. 6d.; season, 15s.; Motor Car Enclosure—daily, 5s.; season, 21s.

These tickets are personal to members, and must be signed by the member to whom they are issued.

Members should apply for tickets through their secretaries and show membership card at entrance.



LANARK FLIGHT MEETING.—Plan to scale of the course and enclosures.

FLYERS AND YACHTS.

(Concluded from page 596.)

Theory of Broadside on Aspect.

HAVING satisfied themselves that the facts of the case are undoubtedly as stated above, our readers may now be interested to know of the theory why these things are. There may be other reasons than that which we are about to advance, but this one is at least logical and in accord with such further experimental evidence as is available. Unfortunately it is not capable of actual demonstration without rather elaborate apparatus, but it is so simple that we think there will be no difficulty about appreciating it at its full value.

Distortion of Air Currents.

In order to get a mental picture which can be associated with the idea under discussion, it is useful to imagine a flat board or thin steel plate set vertically across a current of air (Fig. 8). When the air strikes the plate it does not necessarily stop dead as has been

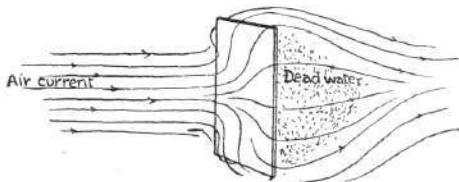


Fig 8.

assumed by hypothesis for the purpose of evolving certain air-pressure formulæ. On the contrary the air behaves just as a stream of water may be seen to behave under similar conditions. It leaks out, so to speak, around the edges of the plate, and thus joins the main stream, which, because of this disturbance, has also become distorted in the vicinity of the obstruction. The leakage, it may be remarked, still takes place when the plate is inclined from the vertical towards the stream, and becomes what is now known as an aeroplane. With very small angles of incidence to the horizontal, that is to say when the plate is very nearly edge on, the

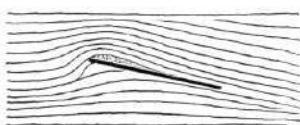


Fig 9.

formation of dead water does not of course take place to the same extent, but the general system of disturbance is still in force (Fig. 9).

Loss in the Stray Field.

Now this leakage may be regarded from the aeroplane point of view as a source of inefficiency, that is to say a cause of reduced lift, and it therefore becomes a question as to whether there is any means of minimising the loss. One point which will immediately strike the thoughtful observer of the situation is that an inclined aeroplane in motion will be continually running into the disturbance which takes place round its front edge, so that here at the outset is something to go upon. It suggests very strongly that the power represented by the disturbance around the transverse edges is not lost, or at any rate not wholly

lost, in a properly-designed aeroplane with a dipping front edge.*

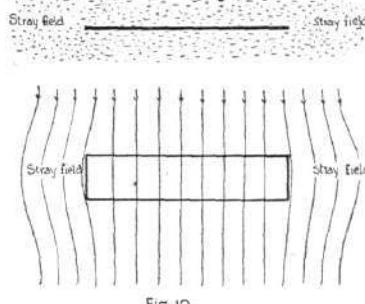
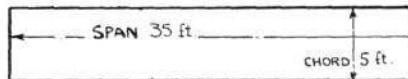


Fig 10.

Of the leakage that takes place around longitudinal edges, that is to say at the extremity of the aeroplane, the same cannot be said, for there is nothing whatever that suggests any means of recovering the energy which is there being dissipated. If we take this point of view as being correct, then the problem resolves itself into the simple question as to how the stray field (Fig. 10), around the extremities may be made as little as possible in relationship to the whole, and the answer is very obviously "by making the fore and aft dimension (chord) of the aeroplane relatively short compared with the span (transverse dimension)," or in other words, by using a broadside



$$\text{ASPECT RATIO} = \frac{\text{SPAN}}{\text{CHORD}} = \frac{35}{5} = 7.$$

Fig 11.

on aeroplane of high aspect ratio; the aspect ratio being the number of times which the span contains the chord (Fig. 11).

Devices for Economy.

It is even possible that still further improvement may be effected by making the extremities pointed (Fig. 12), by reducing their camber or their angle of inclination, any of which should tend to reduce the local intensity of

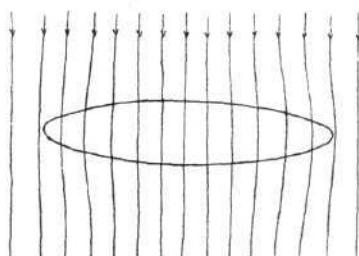


Fig 12.

pressure, and therefore, presumably, the local loss in the stray field. As to how far these latter methods are desirable in practice, insufficient evidence is at present

* See FLIGHT, Vol. I, p. 296.

available to show, but there can be no doubt that all the successful flyers at the present time have the broadside-on aspect, and have, moreover, as high an aspect ratio as the constructors have found feasible.

Constructional Limitations.

It is not difficult to understand that constructive difficulties interfere with the realisation of what is theoretically desirable. A designer might wish to have an aspect ratio of say 10 or 12, because it is known to exist in some species of birds, but would be only too likely to find, when he came to try and build a practical flyer of those proportions, that the constructional difficulties of making it sufficiently strong and rigid without being too heavy, were so great as to make it necessary for him to finally be satisfied with an aspect ratio in the order of 5 or 6.

It may perhaps here be mentioned, as it is a point on which there is occasionally some little confusion, that the question of monoplane, biplane or triplane, does not affect the numerical value of the aspect ratio as obtained by dividing the chord into the span. The aspect ratio is obviously a function of each deck separately, and is the same for a monoplane as for a biplane of similar deck proportions. We draw attention to this fact because so many people are fond of talking about the length of cutting edge, and very often seem to imagine that a biplane is therefore twice as advantageous in this respect as a monoplane of the same span. Like many of these ideas of somewhat indefinite origin there is a fundamental strain of truth underlying the general conception, but as we have shown, the length of cutting edge by itself is unimportant, except so far as it indicates a high aspect ratio, that is to say unless it implies that the span is several times longer than the chord.

The Yacht as a Glider.

We now come to the second part of Mr. Sherrin's query, which relates to the proportions of sails used in yachts.

On this subject the views of a naval architect naturally constitute those of the proper authority, and in this connection Mr. Linton Hope has favoured us with a general *r  sum  * of the situation. It is, of course, perfectly proper to consider the sail of a yacht as an aeroplane in principle, and as such it is regarded by those who have to do with the designing of sails. The yacht designer has for years been putting into practice principles which have, so to speak, had to be re-discovered in the art of flight.

The Bulging Sail and the Cambered Deck.

The bulging sail, for instance, is the analogy of the cambered deck of a flyer (Fig. 13—the sketch is purely diagrammatic); or perhaps, in deference to the older craft, we ought to have put the statement the other way about. The likeness between the two is, in fact, carried very far indeed, for sails are designed to have their maximum fullness situated well up towards the leading edge or luff of the sail. It is precisely the same in the cambered

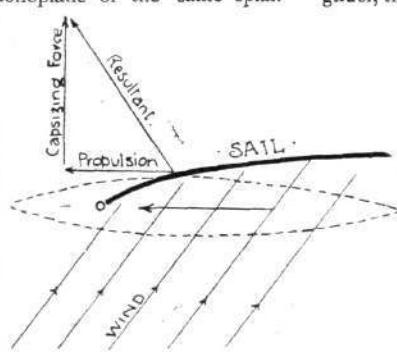


Fig. 14.

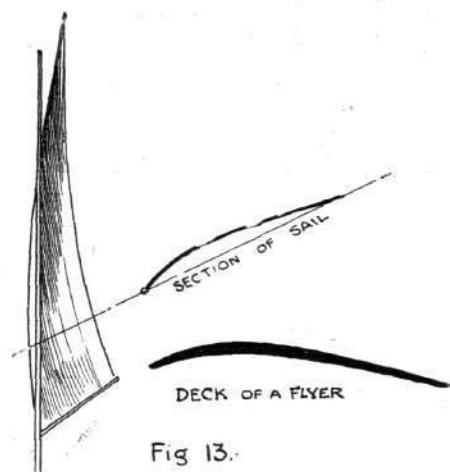


Fig. 13.

deck of a flyer, although it would seem that the latter can stand a much greater camber in proportion to its chord than the sail of a yacht.

Sailing v. Soaring.

Making up to windward is analogous to soaring with a glider, the wind strikes the sail obliquely, and the resultant

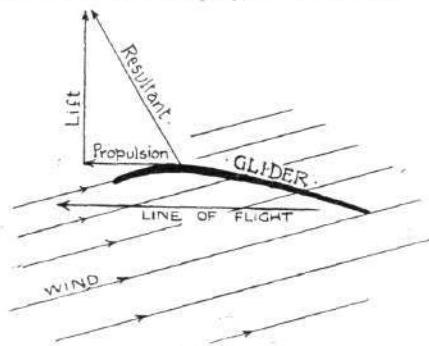


Fig. 15.

of the wind pressure is slightly inclined forward (Fig. 14), due to the sail's fulness or camber. This forwardly inclined resultant splits up into two components, one of which, the smaller of the two, is the propelling force in the direction of the keel. The other constitutes the heeling force which tends to make the boat capsize, but is resisted by the ballast. In the glider (Fig. 15), this other component is that which supports the machine in the air, so that here is the great and vital difference between the two cases which prevents the analogy holding good all along the line, and lies at the root of the answer to Mr. Sherrin's second query.

Shape of Sails.

The yacht designer has not half the love for this lateral component of wind pressure which exists in the heart of the flight enthusiast, but he has perhaps even more respect for it, and he cuts his sails accordingly. Adequate sail area the yacht is bound to have, just as in the case of a flyer, but the disposition of the surface is, as we have shown, governed by considerations which do

not apply in free flight. The yacht designer aims at getting the centre of effort on his sails as low as possible, in order to reduce the heeling moment, which is represented by the product of the lateral pressure multiplied by the leverage provided by the height of the centre of pressure above the centre of buoyancy. Thus for a given area the taller the sail is in proportion to its width, the higher will be the centre of pressure, and the greater the leverage.

And not only so, but the disposition of the weight of the sail and of the accompanying spars would all tend to make a boat top-heavy if they were of the rectangular form which is suitable for free flight. There are many other considerations which yachtsmen will readily enumerate for themselves as to why sails are shaped as they are, but we have perhaps said sufficient to show why aspect ratio does not carry the same weight in yachting as in flight.

* * * *

"DREADNOUGHT" ROTARY ENGINE DEPOSITS.

At the request of the "Dreadnought" Rotary Engine Syndicate we have pleasure in publishing the letter hereunder, dated July 26th, addressed to the Editor of FLIGHT.

After very urgent requests we have been promised details of this engine in about two months time, although at the present time we have no more knowledge of the "Dreadnought" engines than our readers. We are therefore willing to act as temporary trustees for any deposits in connection with this engine, on condition that such deposits are banked in the name of the Proprietors of FLIGHT for a maximum period of six months, at the end of which period, if the engines have not been delivered to and approved by the depositors, such deposits will be returned to each depositor.

The following is the communication from the Syndicate:—

"To the Editor of FLIGHT.

" Dear Sir,—We are rather in a dilemma about the deposits offered us on these engines, and we are writing to ask you if you could give us a helping hand and at the same time act as the protectors of your readers, many of whom are prepared to pay down in advance £250 each for 7-cyl. Dreadnought rotary engines. The difficulty is that the figures seem building up beyond anything we ever expected, and we do not pose as having the credit equal to a first-class banking house, that can accept practically any amount of deposits that may be offered to it, without raising suspicions.

" In our case the situation is as follows:—If we receive orders for 5,000 engines, and receive £250 deposit in cash from each person, this amount will represent £1,250,000.

" We fear people may say: If you get this amount of deposits, we shall never see you again or our money.

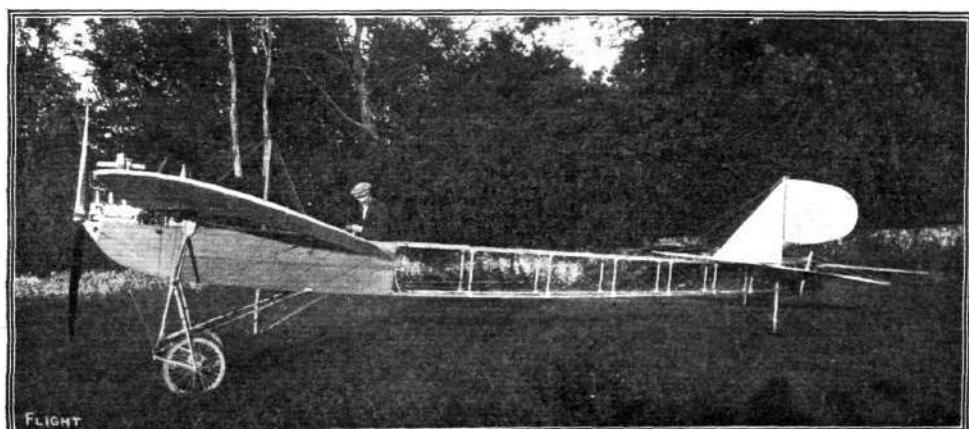
" We also think it only right to point out to you that as our advertisements, asking for these deposits, appear in your most popular and respected paper FLIGHT, that to some extent you may also think you have a duty to perform towards your readers, and doubtless you have the right to ask us, *What are you going to do with those deposits?*

" That is the difficulty. If you would consent to it, we should be very pleased if you would take charge of this money, and bank it in the name of the Proprietor of FLIGHT, as trustee for the various depositors and also as a trustee for the Dreadnought Rotary Engine Syndicate, or, if you preferred it, in the joint names of the Proprietor of FLIGHT and of the Proprietor of the Dreadnought Rotary Engine Syndicate.

" In each case the money to be held for a certain specified time, and only to be paid over to the Dreadnought Rotary Engine Syndicate when the customer in each case had sent his written consent to FLIGHT that he was satisfied with the engine after full trials of same have taken place.

" The Dreadnought Rotary Engine Syndicate would, of course, be prepared to pay all expenses to your paper for your out-of-pocket expense and trouble, and doubtless, by increasing our advertisements in your very excellent paper, endeavour to show our gratitude for thus getting us out of a somewhat delicate position.

" Yours truly,
July 26th. THE DREADNOUGHT ROTARY ENGINE SYND."



The latest Tellier racing monoplane, fitted with a 45-h.p. Panhard engine, which will be used at the big International meeting at Lanark by Audemars. The weight is 350 kilos., span, 9 metres; length, 9 metres and surface, 20·2 square metres.

**The Royal Aero Club
of the United Kingdom**

OFFICIAL NOTICES TO MEMBERS

Lanark International Aviation Meeting, August 6th-13th, 1910.

The attention of members is drawn to the following facilities which will be granted to them at the Lanark International Aviation Meeting which takes place from the 6th to the 13th August:—

Motor Enclosure.—A portion of the Motor Enclosure has been reserved for the cars of members of the Royal Aero Club, the charge for car and driver being 5s. per day or 21s. for the whole period.

Enclosure.—Members of the Royal Aero Club will be admitted to the Special Enclosure, with unreserved seat in the Grand Stand, on payment of 2s. 6d. per day, or 15s. for the whole period, or with booked seat 5s. per day, or 21s. for the whole period.

Members must produce their membership cards when entering both the Motor and Special Enclosures.

Members will also be admitted to the "Club" Enclosure on production of their membership cards.

Hotels.—No special arrangements have been made as regards hotel accommodation. There are only two hotels in Lanark, and both have been booked up. The Peebles Hydro is within 25 miles of the course, and good hotels are to be found at Glasgow and Edinburgh, from which cities special trains will run daily.

Flying Course.—The flying course is within one mile of the town of Lanark, and is almost equi-distant from Glasgow and Edinburgh. It is connected by rail with the Upper Ward of Lanarkshire and the Ayrshire coast, and is only a few miles by rail from Carstairs, which is on the Caledonian and London and North-Western line from the south, and at which station the bulk of the express trains from London stop.

The Caledonian Railway Company has constructed a special station within 300 yards of the course.

The following is the provisional programme of events:—

Saturday, August 6th.—Speed, altitude, slowest circuit, delivery of despatches.



PROGRESS OF FLIGHT ABOUT THE COUNTRY.

(NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries to keep in future to see that the notes regarding their Clubs reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.)

Aeroplane Building and Flying Soc. (8, MANCHESTER ST., W.).

THE Society held its usual monthly meeting on July 26th, at Percy Hall, Mr. J. North in the chair. It was announced that the workshop at Hammersmith was now open for business, and several members gave in their names as being willing to help fit it up. Drawings of a simple but business-like monoplane were critically examined and finally passed, and this is to be put in hand at once, one of the members having offered to send up a quantity of suitable timber for a start. The Chairman's offer to lend the Society a biplane glider he has now in course of construction was received with applause, and all present were urged to look out for a suitable flying-ground on which to try it. The secretary has been in communication with various motor manufacturers, and reported that the Boyd firm have agreed to allow the Society to have an engine at cost price as soon as they are ready for it—which should be in about a month, unless the holidays upset their plans. A paper on "Aerial Propulsion" by Mr. L. White was read by Mr. Ezra, and the scheme very freely criticised. As the inventor was unable to be present, however, the discussion was necessarily rather one-sided, but it was agreed that it might be worth while experimenting with the device later on.

Kite and Model Aeroplane Assoc. (27, VICTORY RD., WIMBLEDON)

ON Wednesday, July 27th, was held the last of the series of competitions fixed for the summer session at the Aerial Garden Rendezvous, Crystal Palace, viz., the longest flight competition for the challenge cup and gold medal presented by Mr. A. W. Gamage; also a youths' kite competition. The field which turned up for the Gamage Cup was 27, and, considering the gusty winds, some good flights were made. Mr. E. W. Twining proved the winner with a splendid flight of 704 ft., Mr. H. Burge Webb being second, thus securing the silver medal, and Mr. V. E. Johnson third, he taking bronze medal. The judges were Messrs. B. S. Varnals, S. Marples,

Monday, August 8th.—Speed, altitude, longest distance, cross-country.

Tuesday, August 9th.—Speed, altitude, weight carrying, longest distance, starting.

Wednesday, August 10th.—Speed, altitude, slowest circuit, cross-country.

Thursday, August 11th.—Speed, altitude, weight carrying, longest distance, starting.

Friday, August 12th.—Speed, altitude, slowest circuit, cross-country, delivery of despatches.

Saturday, August 13th.—Speed, altitude, slowest circuit, longest distance, cross-country.

The gates will be opened at 11 o'clock daily. The Meeting will commence at 12 noon, and cease at sunset each day.

The following particulars may be of use to members who are motoring to the course:—

The police and the Aviation Committee hope and strongly urge that all long-distance traffic will refrain from approaching the enclosures via Lanark, and feel sure that any extra distance involved in approaching from the east via Hyndford Bridge will be more than compensated by a saving in time and by a more comfortable and less-congested access. Cars from Edinburgh should go via Carllops, West Lierton, Biggar and Hyndford Bridge. The direct road from Carstairs and Carnwath to Hyndford Bridge will be closed during the meeting. Cars from Glasgow should go via Hamilton or Strathaven and Lesmahagow by the Carlisle Road to Douglas Mill and thence to Hyndford Bridge.

Committee Meeting.

Owing to the Lanark Meeting, there will be no meeting of the Committee until Tuesday, the 16th inst.

HAROLD E. PERRIN,
Secretary.



LIVERPOOL AND DISTRICT AE. SOC. (1, EXCHANGE STREET WEST).

LAST Saturday week the members of the society paid a visit to the sheds at Frestfield, and had an opportunity of inspecting the two biplanes belonging to Mr. C. C. Paterson and Mr. W. P. Thompson. The latter gentleman has been elected chairman of the Committee, while Mr. W. H. Griffiths is now the hon. sec.

The biplane of Mr. Thompson is of the Pischoff-Werner type. It is fitted with a 60-h.p. Green engine, driving two propellers, 8 ft. diameter, both turning in the same direction. There was too much wind on Saturday for any flying to be indulged in, but the engines of both machines were set going.

SHEDFIELD & DISTRICT AE. C. (22, MOUNT PLEASANT RD., SHARROW)

WILL all members of the two societies which have united to form the above club please note that a very important general meeting will be held at the new club rooms, Cross Burgess Street (Builders' Exchange), kindly placed at the disposal of the members by Mr. Robert Taylor, of Rotherham. The secretary requests all members to make a special point of attending, as important developments in connection with the management of the club will probably be brought forward.

BRITISH NOTES OF THE WEEK.

Monmouth Memorial to the late Hon. C. S. Rolls.

At a cost of £1,000, to be met by public subscription, a marble statue in memory of the late Hon. C. S. Rolls is to be erected in Monmouth, close to which town Mr. Rolls was born, and Llan-gattock village, where he now lies buried, is near the town. The work will be undertaken by Sir Aston Webb, R.A.

Aeronautics Scholarships.

ABOUT a year ago the Governing Body of the Imperial College of Science and Technology at South Kensington awarded two scholarships for research in connection with aeronautics. The initiative in this matter was largely due to the Women's Aerial League, who voted a contribution for a period of years, and one of the scholars bears the name of the "Women's Aerial League Scholar." Through the courtesy of the authorities of that laboratory the students in question have held their scholarships at the National Physical Laboratory at Teddington, and very favourable accounts of their work have, it is understood, been received. Particulars of an additional scholarship offered for award at an early date by the Imperial College will be found elsewhere in this issue. It is gratifying to note that the award in question is open to any properly qualified individual, irrespective of residence or place of education, the desire being to secure the right type of scholar.

Aeronautics in Parliament.

A MEETING of the Parliamentary Aerial Defence Committee was held on Thursday of last week in the House of Commons. Mr. Arthur Lee, M.P., presided, and there were about thirty members present, including Mr. Arthur Du Cros, M.P., the hon. sec., Col. J. E. Capper, R.E., Commandant at the Army Balloon School, attended, and gave his views regarding the probable development and use of dirigibles and aeroplanes. It was reported that the Clement-Bayard airship had satisfactorily completed her trials, and the date of the voyage to London depended solely upon the weather. It was also stated that the *Morning Post* airship was completed, and would sail to England as soon as the official trials had been carried out.

Grahame-White Over the Fleet.

As we briefly recorded last week, Mr. Grahame-White flew over the combined British fleets while they were at anchor in Torbay, the evolutions being watched by the King and Queen and other members of the Royal Family, as well as thousands of spectators who lined every point of vantage from Torquay to Brixham. At half past eleven on the morning of Wednesday week the weather conditions were not particularly favourable, but Mr. Grahame-White gave orders to his mechanics to put the machine together. All was ready at half-past one, and mounting to his seat Mr. Grahame-White had the machine in the air after a run of fifty yards. First heading towards Paignton, the aviator afterwards turned out to sea and passed over a section of the fleet which had remained at anchor, and then returned to his starting place—one of the Torre Abbey meadows—where he landed safely. At five o'clock, after the fleet had returned to its anchorage, Mr. White started off again, and

rising to a height of about 800 ft., he steered for the "Dreadnought," over which he circled. He then made for the Royal yacht before again returning to his starting-point, where a safe descent was made after a trip which had occupied about twelve minutes. The machine was then dismantled and packed up for transmission to Blackpool.

During the early hours of the morning of the previous day Mr. Grahame-White had attempted to fly over from Penzance, but on account of the troublesome wind he had to come down at Camborne, after a twenty-five-minute trip. The machine was therefore dismantled and entrained for Torquay, where it was re-erected on the following day for the Fleet episode mentioned above.

Mr. Roe has Very Hard Luck.

MR. A. V. ROE was the victim of a stroke of very bad luck on the eve of the opening of the Blackpool meeting. The two machines with which Mr. Roe has been doing so well at Brooklands were packed on railway trucks for transmission, but unfortunately, when making up the train these trucks were placed next the engine. Apparently during the journey some sparks from the engine fell on the wooden packing and fired it. The conflagration had obtained a good hold before it was noticed, and the two machines were entirely demolished. Mr. Grace's Short machine was travelling in the next truck, but fortunately that was saved.

The news of the accident reached the Roe works at Manchester on Wednesday evening, and at once all hands lent willing help to get another machine ready. The greatest trouble was to get an engine, but this was managed by Saturday morning, and on Monday the new machine was flying at Blackpool.

I.M.E. Conversazione.

AT the conversazione held on Thursday of last week at the Institution of Mechanical Engineers in connection with the joint meeting with the American Society of Mechanical Engineers, Dr. H. S. Hele-Shaw gave a lecture on "Stream Line Experiments," illustrating automatic stability.

Southend Meeting Off.

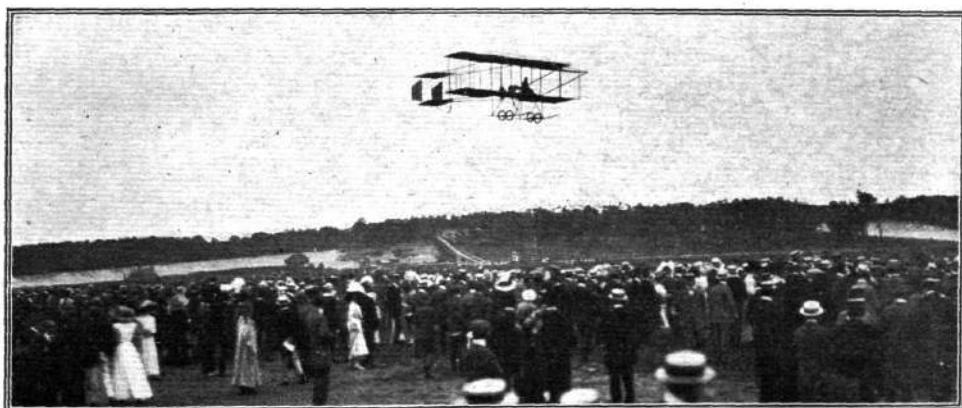
WE regret to hear from Mr. George Neill that the proposal to hold a national flying meeting at Southend has had to be abandoned, and so this meeting will not be held.

Radley going to America.

IN about a fortnight's time Mr. James Radley will probably be leaving England for America, where he intends to compete for the Chicago to New York £5,000 prize. He is taking a new racing Blériot machine, fitted with a 50-h.p. Gnome engine, which he hopes will prove faster than anything the Wrights or Curtiss will use.

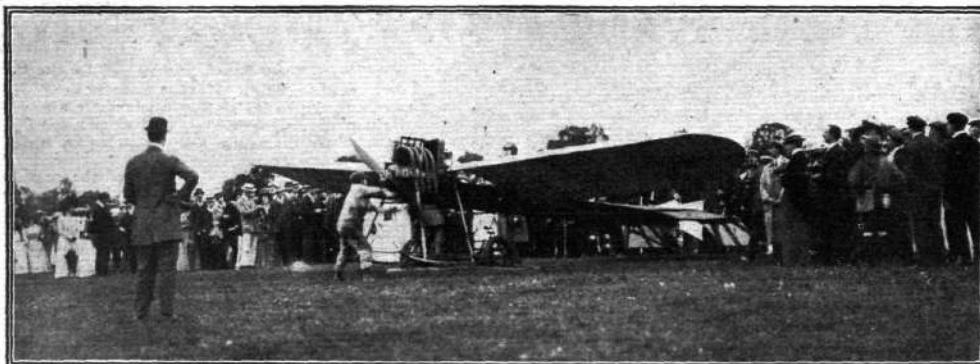
Accident to Capt. Maitland.

WHILE trying his new biplane over Salisbury Plain, on Sunday last, Capt. Maitland met with an accident, as a result of which he sustained rather serious injuries. He was flying at a height of



"Flight" Copyright.

Blondeau, on Mrs. Grace Bird's Farman biplane, in flight over the aviation grounds at Brooklands on Bank Holiday.



"Flight" Copyright.

FLYING AT BROOKLANDS ON BANK HOLIDAY.—Starting Cordonnier's Hanriot monoplane for the flight in which he landed his machine in the river Wey.

between 30 and 40 ft. when he touched a wrong lever, and in consequence the machine suddenly dived to earth. Fortunately, the Captain was able to right the machine before the crash came, and when he was extricated from the *débris* of the machine it was found that he had sustained a fracture of one leg, while the other was dislocated. On Tuesday Capt. Maitland was taken to the King Edward Hospital in London, where his injuries were surgically attended to.

Fatal Accident at Boldon.

THE visit of "Mme. Franck" to Boldon was marred by a serious accident, as a result of which a fifteen-year old boy was killed. On Saturday she made a short flight from the Boldon racecourse, and landed in a field. This performance drew a large crowd to the racecourse on Monday, when the aviatrix started off to fly round the course, a distance of about $1\frac{1}{2}$ miles. She had made four circuits at a height varying between 30 and 50 feet, and was completing the fifth when in passing a flag-pole, one of the planes fouled it. The machine at once turned over and fell to the ground. It landed across some palings, and unfortunately a lad who was standing by was struck by the engine and instantly killed, while three other men were slightly injured. Mme. Franck sustained a compound fracture of the left leg and her neck was also cut by a stay wire. After her injuries had been attended to she was removed to the Sunderland Infirmary, where she is reported to be progressing favourably.

An Aerodrome at Southport.

SOUTHPORT is determined not to be left out in the cold in regard to flying matters, and a portion of the foreshore at the north end of the promenade has been leased to Mr. Woodhead for the

purpose of erecting hangars for the use of aviators. This place is to be fenced in and drained, and will be used as an exercise ground. It is estimated that Southport aviators will have the opportunity of flying over 200 square miles of ground.

Doings at Brooklands.

ALTHOUGH a series of good prizes were offered by the Brooklands Club for competition among the flyers there during the race-meeting on Monday, the high wind which prevailed until 6 o'clock rendered it advisable for all machines to remain under cover. At 6 o'clock, however, the improved conditions brought out Blondeau on Mrs. Grace Bird's Farman biplane, and he successfully completed fifteen rounds of the course in 36 mins. 47 secs., the distance covered being about 25 miles. Cordonnier made a start on the Hanriot monoplane, but he had only covered a short distance when he came down again, and before he could stop the machine it ran down the bank of the Wey to the water. It was, however, soon rescued with the aid of some Boy Scouts. Mr. L. D. Gibbs was also trying his Sommer biplane, but did not make any lengthy flight.

Ferguson Monoplane at Newcastle, Co. Down.

ALTHOUGH the wind was blowing at the rate of 20 miles an hour, Mr. Harry Ferguson succeeded in making a flight of half a mile at Newcastle, co. Down, on the 26th ult. He took his monoplane down to the sands, and after a run of about 200 yards got it in the air, when for half a mile it flew at heights ranging from 5 ft. to 30 ft. At the finish of this trip it was nearly overturned by a gust, but Mr. Ferguson righted it, and the only damage was a couple of buckled wheels and a broken stay.



CONTINENTAL FLIGHT MEETINGS.

Brussels Meeting.

DURING Monday and Tuesday of last week bad weather prevailed at Brussels, and the programmes for these two days were deferred to later in the week. Wednesday was a good day, and Lauser made two trips, one of 48 mins. 28 secs. and another of an hour and a quarter's duration, while Kinet made two flights of 42 and 58 mins. respectively. Oliegaers was also up on his Blériot for 37 mins., while de Ridder took his wife for a short spin on his Voisin. Thursday proved another good day, and Tyck, on his Blériot, ascended to a height of 560 metres, while Kinet, in a flight of half an hour, scored the longest during the day. In addition to these two flyers, Lauser, Oliegaers and de Ridder were also out. Although a large crowd gathered at the Stoekel Aerodrome on Friday they saw very little, except for a flight of half an hour by Kinet. Baron de Caters brought out his Voisin and made a short flight, as also did Lauser and de Ridder. Saturday was a busy day, as the aviators competed during the morning for the prizes which had to be postponed from Monday, while in the afternoon there were the ordinary daily competitions. The longest flights were those of Oliegaers and Kinet, the former flying for 2 hrs. 46 secs., while the latter was up for 1 hr. 41 mins. Oliegaers, too, indulged in some high flying, and was officially certified to have reached 1,460

metres. Passenger flights were made by Kinet, Lauser, Verstraeten and Van den Born.

Two days' prizes were also competed for on Sunday, those originally offered for Tuesday being put up during the morning, and shared by Tyck, Lauser, and Kinet. Tyck won the height prize with 350 metres, Lauser carried a passenger for 10 mins., while Kinet made the longest flight of 50 mins. Kinet won the height prize during the afternoon with 415 metres. Kinet as a matter of fact won all the prizes during the afternoon. He and Oliegaers were the only aviators out, and the latter only flew for 20 minutes, rising to a height of 400 metres.

Monday was the best day of the meeting, and six aviators made good flights, while Tyck gave a wonderful display by rising to a height of 1,720 metres, the next best being Oliegaers, 960 metres. This achievement places Tyck second in the competition for world's record. He disappeared from view for some time and landed at Campenhout, where he was located by Lauser, who made a tour of inspection of the surrounding country on his Farman. Three long flights were made, Lauser being first with 1 hr. 9m. 15 $\frac{1}{2}$ s., during which a passenger was carried, while Oliegaers was second with 1 hr. 9m. 12 $\frac{1}{2}$ s., and Kinet third with 1 hr. 1m. 52 $\frac{1}{2}$ s. In addition to these four flyers, Verstraeten was also up for just on

half an hour on his Sommer machine, and Van den Forn for a quarter of an hour.

The Meeting at Caen.

The opening day of this meeting on Wednesday of last week was very successful, for seven flyers were out, the most industrious being young Marcel Hanriot, whose cumulative flying time for the day was 2h. 55m. 50s., Martinet coming second with only 5 mins. less. The other flyers out were Paillette (Sommer), Renaux (M. Farman), Chauveau (Antoinette), Crochon (H. Farman), Daillens (Sommer). The daily height prize went to Paillette, who rose to 297 metres. Thursday was an off day, and the only flying was 10 mins. by Hanriot and Morane and 3 mins. by Paillette. Friday, however, was a busy day, the chief event being the cross-country race in which the competitors had to travel round the tower of the church at Bellengreville. Morane, Hanriot and Renaux competed, and they finished in that order, Morane's time for the 21 kiloms. being 13 mins. 56 secs., Hanriot's 18 mins. 15 $\frac{1}{2}$ secs., and Renaux's 23 mins. 56 secs. Morane also won the height prize, going up to 908 metres, while Hanriot was second, although he only reached 284 metres. Saturday saw all the flyers in the air, and in addition three officers—Lieuts. Cammerman, Cronier and Aquaviva, all on Henry Farman machines—were competing for the speed prize. They finished in the order given, Lieut. Cammerman's time being 13 mins. 6 $\frac{1}{2}$ secs. During the day Paillette was flying for three hours and a quarter, while Hanriot's total was 3 hrs. 2 mins. On

FOREIGN AVIATION NEWS.

Henry Farman Carries Three Passengers for an Hour.

A REMARKABLE step forward was made on Monday last at Mourmelon, when Mr. Henry Farman, on a biplane of his No. 11 type, carried three passengers, MM. Vaillaume, Roth and Lepoix, for 1 hr. 4 mins., the total weight carried, including passengers, oil and petrol, being 285 kilogs.

And De Baeder, on a Breguet, also Takes up Three.

ON the same day, at Douai, De Baeder, on the Breguet biplane, also carried three passengers, MM. R. Castro (79 kilogs.), L. Briancon (74 kilogs.), and F. Guibert (66 kilogs.), for a short flight. M. de Baeder weighs 69 kilogs. himself, and the total weight carried, checked by the Aero Club of France officials, was 322 kilogs. The machine was the same as that which was at Rheims. On Sunday De Baeder secured the Boequet prize by flying from Douai to Vimy. It will be remembered that M. Sommer was the first to fly with three passengers some time ago at Mouzon.

The French Coupe Michelin.

AMONG the official results issued in connection with the Rheims meeting it was announced that Olieslaegers was the leader to date in this year's competition for the French Michelin Cup. It was overlooked that the competitor must be a member of the club of the country in which the flight was made. In consequence of this the Belgian aviator was not eligible, and so Labouchere takes first place with his flight of 340' 25 kiloms.

Chateau and Audemars on the Tellier.

SOME very fine flights have recently been made by Chateau on his Tellier monoplane. On the 27th he went up from the Draveil flying ground, and circled above Juvisy for some time, and then cut off the ignition and planed down safely to the ground from a height of 200 metres. He repeated this performance in the afternoon. Last Saturday morning a still better performance was carried out. Leaving Draveil he headed for Buc, and after 20 minutes landed there by planing down from 300 metres. Half an hour later his mechanics arrived in a motor car, and after replenishing, the Panhard motor was again started, and Chateau left on the return journey, which was safely accomplished. Audemars has been practising on the machine with which M. Dubonnet has been so successful, and it is expected that he will be flying one of these new racing machines at Lanark.

Dufour in a Pond.

DUFOUR had an exciting time at Palavas, near Montpellier, last week. On Wednesday, in trying to avoid the crowd which gathered round the spot where he wanted to alight, he broke a propeller. On Thursday, after waiting several hours in order to witness flight, the crowd became impatient. In order to appease them M. Dufour determined to go up, although his Blériot machine needed some adjustment. He had flown 300 yards and was just crossing a pond when the machine suddenly dropped. Fortunately

Sunday Crochon was not out, but there were again eight flyers practising as Aubrun turned up with his Blériot. Hanriot by his total of 2h. 19m. 49s. for the day further improved his position as leader in the totalisation competition. Chauveau also totalled 2h. 11m. 13s. during the day, while Martinet was third with 1h. 17m. 20s. The special contest for the day was the eliminating trials for the speed prize. Among the monoplanes Morane was first, Aubrun second, Hanriot third and Chauveau fourth, while among the biplanes Renaux on his Maurice Farman proved best, with Martinet and Daillens second and third. Monday was another off day, the weather being entirely against flying. After official hours had closed, Lieut. Cammerman and Lieut. Cronier competed for M. Deutsch's prize, the former flying for 22 mins. 40 secs. and the latter for 20 mins. 11 secs.

The Marseilles Meeting.

ALTHOUGH the meeting at Marseilles was continued last week, very little flying was seen. On Wednesday, Thursday, Friday, and Saturday, both Vallon, on his Sommer, and Fischer, on his Henry Farman machine, made short flights, and on Sunday last, the closing day, Dufour arrived with his Blériot. He made a couple of short flights, and for the first time during the fortnight the spectators saw two machines in the air at one time. Fischer made the longest flight, which lasted half an hour, during which time he flew over the city of Marseilles.



the water was shallow, and so neither aviator nor monoplane were seriously hurt.

Paulhan a Chevalier.

In Monday's *Journal Officiel* an announcement was made that Louis Paulhan had been created a Chevalier of the Legion of Honour. Already the hero of the London to Manchester flight had received official recognition by being made an Officer of Reserve, and this is a further distinction. At present M. Paulhan is resting on his laurels at Satrouville, and is said to be making preparations for launching out as an aeroplane manufacturer.



Mdme. "Franck" (and her husband, Mr. Hewetson), who has made so many successful flights on the Continent, and who met with an accident while flying at Boldon on Monday. It will be remembered Mdme. Franck hoped to fly the Channel on her Henry Farman recently, but the stormy weather prevented her attempt.



THE FLÉCHE MONOPLANE.—This novel machine has been constructed at Levallois to the designs of MM. Lanzi and Billard. It has two propellers, one in front and one behind, driven by a 25-h.p. motor. It is 8 metres long, 6 metres span, and weighs 290 kilogs. in running order. The chassis has 4 wheels and skids. The wings have stabilising flaps.

M. de Lesseps Sails for Home.

By way of a farewell, M. Jacques de Lesseps on the evening of the 26th ult. made one of his best flights in Canada. Rising from the Ile de Grouin Bois in the St. Lawrence, he flew 15 miles to the west of Montreal, then turning he travelled back along the river and over the city and the Ile de St. Hélène. Then following a wide sweeping curve he landed at his starting-place after a trip of 37 mins., during which he had covered about 40 miles. On Thursday week he sailed with his brother and sister on the "Savoie" on his way home. Before leaving New York he expressed his gratification for all the courtesy he had received in New York and Canada, and announced his intention of returning in October for the International Meeting.

Doings at Mourmelon.

The Farman School.—During the past week Mr. Henry Farman has been busy every day testing new machines and new ideas. On Saturday he made a trial trip lasting a quarter of an hour, for the purpose of trying a new elevator, while on Monday he flew for ten minutes with a passenger weighing 16 stone, and later he took three passengers at one time for a 20 minute jaunt. Dufour, Beaud and Efimoff have also been daily either testing new machines or giving lessons to some of the pupils, while Weymann, at the end of last week, was practising with his new machine. On Friday Louis Dufour was trying two new machines built for the Russian Government. On one he flew for 32 mins. over the country, and on the other for 12 mins.

Other Schools.—At the Antoinette school Laffont has been giving lessons to several pupils. One of the most promising is Goffin. On Saturday, at his first solo flight, he rose to a height of 30 metres, and flew for 10 minutes. Visseaux, one of Bouvier's pupils at the Sommer school, is equally apt. At his initial flight alone on Monday he completed four circuits of the camp, handling his machine like an expert. On Wednesday week Molla, on his Sommer, flew for 40 minutes.

At the Voisin School, Bregi has been testing his racing machine, on which he accomplished a flight of an hour and a half on Friday, while on Monday Morlat was out for fifty minutes at a height of 50 metres. Bielovucic flew for an hour on Wednesday week.

A new machine on the ground is the Train monoplane, on which its designer and owner qualified for a pilote aviateur's certificate on Saturday last. Gaston and Mauthé have also been practising on the Nieuport monoplane, while Jolliot has been experimenting with a Koehlin.

Practice at Juvisy.

LADOUINE, on his Goupy machine, was in the air for three quarters of an hour at Juvisy on Monday at a height of 150 metres, and Godard, on his Voisin, made an excursion, lasting half an hour, over the surrounding country. Didier has also had his Henry Farman machine out on several occasions.

Sommer Back at Mouzon.

SOMMER and Lindpaintner were back at their old flying-ground at Mouzon on Wednesday week testing a new racing machine which has been built with a view to taking part in the Circuit de l'Est. Rising to a height of 400 metres, Sommer flew for an hour

and a half, passing over Mouzon, Autrecourt, Villers, Memilly, Bazailles and Bolan, and circling round the spire of Mouzon Cathedral. His speed is said to have been in the neighbourhood of 85 kiloms. per hour.

Maurice Farman Out Again.

HAVING recovered from the effects of his recent accident, Mr. Maurice Farman has once more been indulging in flying. On Wednesday week his father accompanied him for a short trip, and some of the military pupils at the school were also given lessons.

Flying Round Mont St. Michel.

RISING from Avranches on his Voisin biplane on Sunday last, Forest made for the Mont St. Michel, and on arrival twice circled round the ramparts and above the fort, and then returned to his starting point. The little trip lasted 24 minutes, during which it is estimated that about 30 kiloms. were covered.

Blériot Pupils at Issy.

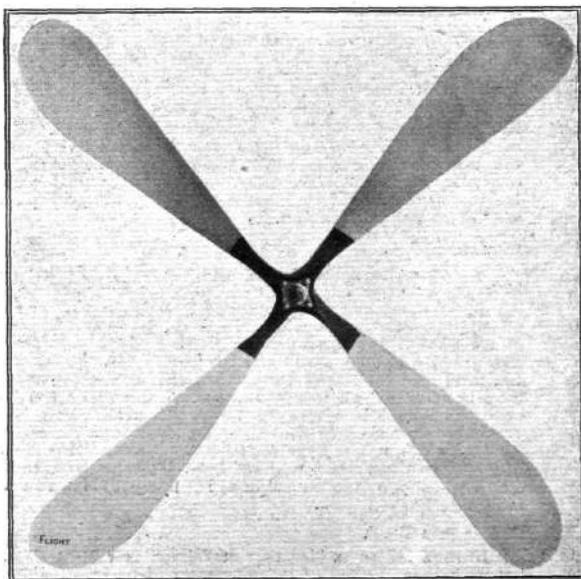
DURING the past week there has been a tremendous lot of activity at Issy, where a number of pupils of the Blériot school have qualified as pilots, while the pupils at the Odier-Vendome and Zenith works have also been busy.

Busson at Rennes.

ON Sunday Busson, on his Blériot machine, flew for three quarters of an hour at a good height at Rennes. Paul de Lesseps was also out on his Sommer machine. He brought the machine down suddenly, but fortunately without doing very much damage to himself or the machine.

Flying Up a Mountain.

ACCORDING to the Italian Press a remarkable performance was made by two young Swiss gentlemen on the 27th ult. For some time they have been practising at Lecco with a couple of aeroplanes, and on Wednesday of last week they flew up the mountain known as the Pizzo dei tre Signori, which stands 2,584 metres above sea level, and after circling above the peak they landed safely and easily in the Valley of Biaubino. Confirmation of this and some further details should prove interesting.



The above photograph illustrates a four-bladed propeller made by T. W. K. Clarke and Co. for a foreign Government dirigible. Its diameter is 11 ft. 6 ins., and its pitch 14 ft. 2 ins.; it is thus one of the largest if not the largest propeller yet built in England.

AIRSHIP NEWS.

"Clement-Bayard" Out for an Hour.

On Monday last the Clement-Bayard airship was taken from its shed at Lamotte Breuil and cruised for an hour in the vicinity, afterwards returning to its shed without any untoward incident.

German Legislation Against Aviators.

A CODE of regulations has been drawn up by the Government of the Province of Brandenburg, imposing a scale of fines for the offence of flying over towns and villages. The fines range up to £3, and in default of payment the flying machine becomes liable to distraint. The edict, however, does not apply to dirigibles.

In the proposed cross-country race from Frankfort to Mannheim, any competitor flying above the towns of Frankfort, Hochst, Wiesbaden, Mainz, Worms, or Mannheim, becomes liable to a fine of £5, and competitors have also to sign a declaration that they undertake all responsibility for any damage to property during their flight.

German Aerial Manoeuvres.

AFTER a delay of ten days, due to the unfavourable weather, the German aerial manoeuvres commenced on the 27th ult. at Metz, when "Zeppelin I," "Parseval I," and "Gross II" cruised above the city for some time. The tests were also continued on the two following days. In order to assist in the carrying out of evolutions

at night, powerful searchlights have been fixed at the top of the airship sheds.

Adventures with "Parseval VI."

AT midnight on Saturday "Parseval VI" left Bitterfeld for a voyage to Munich, but owing to the propeller requiring adjustment a descent was made at Lobtaerdt. This was repaired, and the vessel made a fresh start, but she was overtaken by a storm at Goldkronach, near Bayredith, and another descent had to be made. After the envelope had been replenished with gas, the journey was continued when the storm had passed.

"Gross III" Sails to Gotha.

RISING from the Tegel parade ground at eleven o'clock, on Wednesday evening of last week, the German Army airship "Gross III" cruised over to Gotha, which was reached at 6.50 the following morning. The journey, *via* Nuremberg, Weimar and Erfurt, was of 170 miles. Before descending, the airship made a wide detour to Eisenbach. It had been intended that the vessel should return to Berlin on the Friday, but in view of the tempestuous weather she remained in dock. On Saturday evening, however, at nine o'clock, a start was made, and Berlin safely reached at half-past three the next morning. After cruising about the city it was returned to its shed.



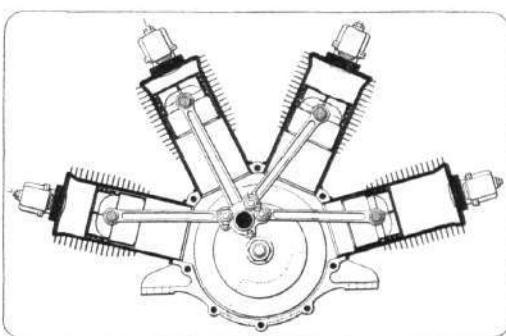
THE MILLER AEROPLANE ENGINE.

A NEW air-cooled, semi-radial, stationary engine for aeroplanes is now available for aviators in this country, the rights of the Italian built Miller engine having been acquired by Mr. Lawrence Santoni, who has also, as our readers are aware, secured the exclusive agency of the very successful Tellier monoplane. The Miller engine represents an uncommon type, inasmuch as its four cylinders are arranged radially above the axis of the crank-shaft, which constitutes what we have for convenience termed the semi-radial type of engine. Hitherto this form of motor has commonly been limited to three cylinders, for in those cases where there have been more than three cylinders the arrangement adopted has commonly been the V formation. In the Miller engine lightness has been secured by this radial arrangement, owing to the economy in crank-chamber and crank-shaft metal that results therefrom.

There is only one crank, and all four connecting-rods are hinged thereto. One of these is attached in the usual way by a big-end bearing, while the others are each independently hinged to a kind of flange situated alongside the big-end of the first connecting-rod. This system is similar in principle to that adopted in the Gnome engine. The cylinders are air-cooled, and are spaced 50° apart, and the firing order is 1, 3, 2, 4. This gives a sequence of firing intervals in degrees of 0, 100, 310, 100, 210, 0, which compared with the common sequence in a four-cylinder V engine, which is as follows:—0, 90, 270, 90, 270, offers an interesting comparison.

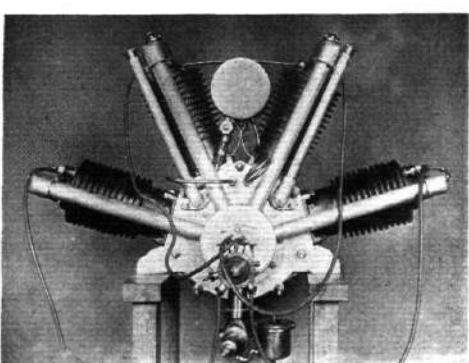
The valves are all in the cylinder-heads, the inlet being atmospherically operated and the exhaust controlled by overhead rock-levers and radial push-rods from a series of cams. The weight of the Miller engine is, we understand, 154 lbs. It is rated at 30-40 h.p., and on test has developed 30 h.p. at 800 r.p.m. on a

consumption of 71 pint of petrol per horse-power per hour. Forced feed lubrication in conjunction with splash lubrication is

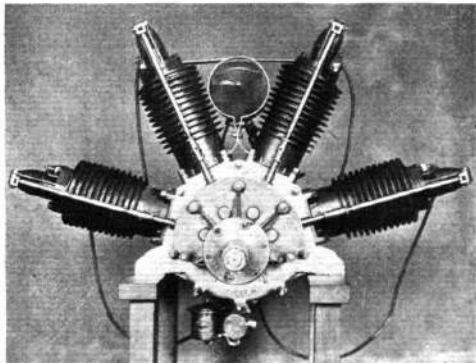


Section of the Miller engine for aeroplanes, showing the arrangement of the connecting-rods.

used, and the Miller engines are provided with magnetos and float-feed spray-jet carburettors.



Views of the Miller engine for aeroplanes, showing the arrangement of the carburettor and radial induction-pipes.



CAN WE FLY FASTER FOR LESS POWER?

SUGGESTIONS FOR WINNING THE "DAILY MAIL" £10,000 PRIZE.

PART III. (Conclusion.)

IN the two preceding articles on this subject we have discussed the power required to propel cambered planes at different speeds and have suggested a method of calculating the lift that results from such impressed velocity. Throughout we have drawn attention to the angle of 5° as representing the condition of minimum resistance, and it is the purpose of the present article to show how that angle has been derived.

It has already been explained that the determining factor in the calculation is an assumed coefficient and law of skin friction, and we purpose, therefore, discussing the question of skin friction forthwith. The most reliable data on the subject are to be found in the results of experiments conducted by Prof. A. F. Zahm, who established the relationship between skin friction and velocity in the following formula : $R = 0.0000316 / V^{1.85}$ (where R = skin friction in lbs./sq. ft. of double surface, l = length of surface, i.e., chord, V = flight speed in p.h.)

The above expression of the law of skin friction shows that the resistance due to this cause varies with the length of surface as well as with the velocity. As the length of service of an aeroplane is not very great, we have, for convenience, ignored this factor in the equation, which would, of course, have to be taken into account in calculations affecting the skin friction of a dirigible. Zahm's formula for skin friction is thus modified for the present purpose to the expression $R = 0.0000316 V^{1.85}$.

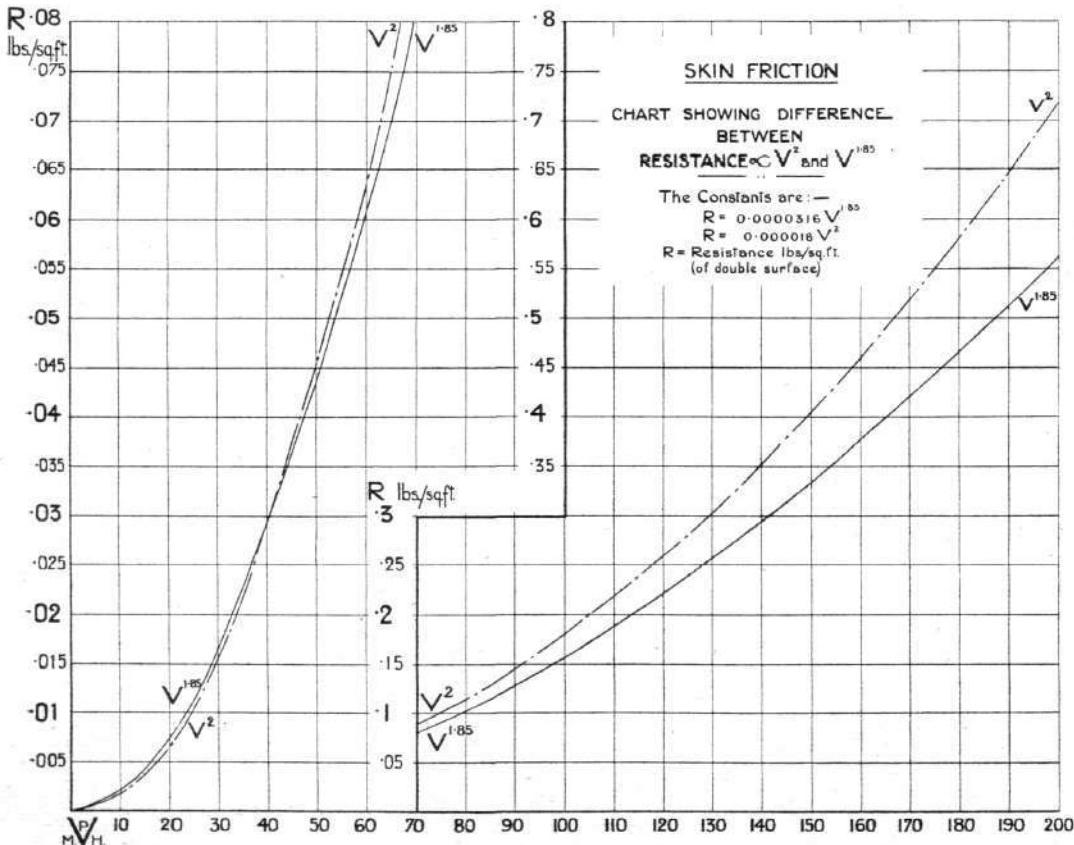
It will be observed that the index of V , which is 1.85, is approximately the square, and as it would be very convenient to assume that the skin friction is proportional to V^2 it is worth while investigating the nature of the error of such an assumption in order to see how far it is likely to affect calculations. In an accompanying chart we have shown this difference by means of two graphs, one of which is plotted to represent Zahm's law, while the other is

plotted to the V^2 law by means of an assumed coefficient (.000018) that makes the results identical for a velocity of 40 miles an hour. This speed is in the order of that of modern aeroplanes. It will be noticed that the two graphs lie fairly close together up to a speed of 90 miles an hour, after which speed the discrepancy becomes more serious. It would seem, therefore, as if it is quite justifiable to assume the V^2 law for skin friction as applying within the limits of the probable flight speeds of the immediate future. We may thus write $R = .000018 V^2$.

The importance of this assumption is due to the fact that the aerodynamic resistance, which constitutes the other part of the total resistance to flight, varies inversely as V^2 , and the consequence of assuming the V^2 law for the skin friction is that it establishes a very simple condition for the minimum total resistance, which obtains when the resistance due to skin friction is equal to the resistance due to load.

By the aid of Zahm's experiments, and the assumption of a suitable coefficient, we have been enabled to establish actual values for skin friction; it remains, therefore, to find an expression representing the aerodynamic resistance in flight, and here again it is necessary to make another assumption to the effect that the energy expended on the support of the load is entirely represented by the energy remaining in the deflected air stream, or wave as it might be called, that the aeroplane creates. Applying first principles to this assumption, we must work from the fundamental formula :—Energy (ft. lbs. per sec.) = $\frac{1}{2} m v^2$.

Once again we will assume, as in the previous article, that the effective stratum of air deflected has a depth equal to the chord of the plane, whence we may write : m (per sec.) = $\frac{\rho}{g} L l \frac{V}{l} = \frac{\rho}{g} A V$ (where L = span, l = chord, V = flight-speed, ρ = density, g = gravity, A = area); for the velocity we will also assume, as in the previous



article, that $v = V \tan \beta$. $\therefore v^2 = V^2 \tan^2 \beta$, from which we derive the final expression for energy in the form

$$\text{Energy (per sq. ft. per sec.) } \frac{\rho}{g} V^2 \tan^2 \beta$$

(where V = flight-speed in miles per hour; β = the angle of deflection; ρ = density; g = gravity).

If we assume that this energy is transmitted without loss from some product of thrust and speed of flight we may write $TV = \frac{\rho}{g} V^2 \tan^2 \beta$ whence $T = \frac{\rho}{g} V^2 \tan^2 \beta = \frac{V^2}{400} \tan^2 \beta$ (where T = thrust for aerodynamic resistance alone, V = flight speed m.p.h.; ρ = density; g = gravity; β = angle of deflection).

Here, therefore, we have a very simple expression for the aerodynamic resistance alone, which we may equate to the formula for skin friction in order to obtain the condition of minimum total resistance.

$$\text{Thus, } \frac{V^2}{400} \tan^2 \beta = .000018 V^2$$

$$\therefore \tan^2 \beta = .0072 \quad \therefore \tan \beta = .085$$

$$\beta = 4^\circ 51' = 5^\circ \text{ approx.}$$

Having established the angle of the plane, the next step is obviously to write down an expression for the total thrust, which will be equal to twice the aerodynamic resistance, in the form

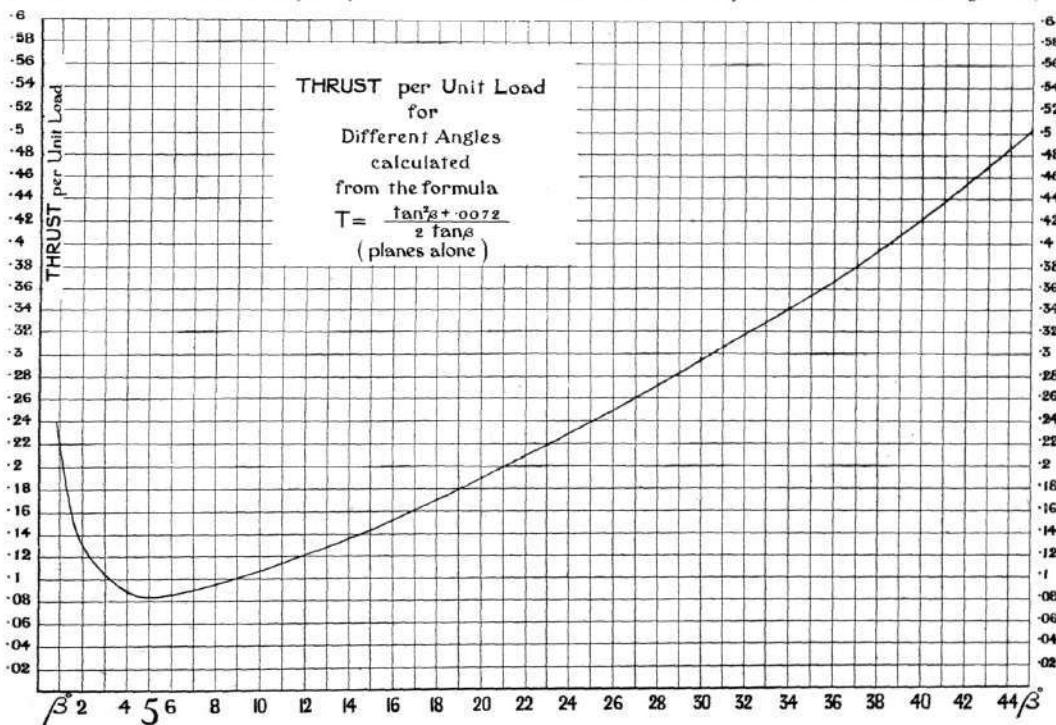
$$T = \frac{V^2}{200} \tan^2 \beta$$

From this the ratio of thrust to lift may be evolved thus:—

$$\frac{T}{P} = \frac{\left(\frac{V^2}{200} \right) \tan^2 \beta}{\frac{V^2}{200} \tan \beta} = \tan \beta$$

which shows that the gliding angle is equal to the angle of deflection for the condition of *minimum resistance*, in other words the minimum gliding angle for air is 5° , and the minimum coefficient of horizontal flight is 1 in 12 or .085.

For any other condition than that of minimum resistance the above equations do not hold good, because the aerodynamic resistance will no longer be equal to the skin friction, and, therefore, the total thrust will not be adequately represented by twice the aerodynamic resistance. A fairly simple formula for thrust may, however, be derived by first establishing an independent ratio between the lift and each resistance separately.



Thus, for skin friction, $\frac{T}{P} = \frac{.000018 V^2}{200} = \frac{.0036}{\tan \beta}$, and for aer-

dynamic resistance, $\frac{T}{P} = \frac{\frac{400}{V^2} \tan^2 \beta}{\frac{200}{V^2} \tan \beta} = \frac{\tan \beta}{2}$, whence the total thrust

is obtained by adding together the above expressions,

$$\frac{T}{P} = \left(\frac{\tan \beta}{2} + \frac{.0036}{\tan \beta} \right) = \frac{\tan^2 \beta + .0072}{2 \tan \beta}$$

The results obtained by this formula are shown graphically in the accompanying chart of thrust per unit load for different angles. The characteristic shape of the graph therein represented is very interesting and should be borne in mind by all those interested in the design of aeroplanes. It shows the condition of minimum resistance coinciding with the angle of 5° and illustrates how inefficient it would be to use planes flatter than this value. That part of the graph to the left of the angle of 5° quite evidently marks a sort of danger zone that should be avoided, and the mere fact that the angle of 5° itself is such a critical point suggests that it would be far safer to keep on the high side. Thus we should suggest an angle of say 8° as the lowest safe value for preliminary experiments until there is more knowledge of the subject. With an angle of 8° there is still a little latitude before entering the danger zone, and the thrust factor is not seriously increased. If we investigate by the aid of this chart the conditions prevailing with larger angles we find that the coefficient of thrust for an angle of 21° is .2; that is to say, the gliding angle is 1 in 5, or about $11\frac{1}{3}^\circ$.

Once more it is necessary to emphasise the fact that the chart represents the thrust required for the propulsion of the plane alone, and must be augmented by that required to overcome the body resistance and the skin friction of the supplementary surfaces in order to obtain an estimate of the total thrust required for a practical machine.

In conclusion we will take two numerical examples, the first representing a machine with 5° planes for minimum resistance, and the second representing a machine with planes having an angle of deflection of 20° . We will suppose that the load carried in both cases is 1,000 lbs., and that each machine has an extra resistance represented by 200 sq. ft. of skin friction. We will further assume that both machines carry the load with the same loading, which, for

the sake of example, we will suppose to be $2\frac{1}{2}$ lbs. per sq. ft. This lift will be obtained from a 5° plane at a speed of 70 miles an hour, and from a 20° plane at 35 miles an hour. At 70 miles an hour the extra resistance of 200 sq. ft. of skin friction is 16 lbs., and at 35 miles an hour 4·6 lbs. The thrust required for a 5° plane alone is shown by the chart to be 85 lbs., and for a 20° plane it will be 190 lbs.

Adding the extra resistance brings these values up to 101 lbs. for the 5° plane, and to 194·6 lbs. for the 20° plane. In the case of the 5° plane the flight speed is 70 miles an hour, so that the net horse-power consumed is 18·9, while in the case of the 20°

plane, which flies at 35 miles an hour, the horse-power is 18·2. These powers are to all intents and purposes equal; that is to say, the same engine operating on equally efficient transmission mechanism and propellers could transport a load that it could only carry at 35 miles an hour with a 20° plane at a speed of 70 miles an hour with a 5° degree plane, even allowing the same amount of supplementary surfaces to the two machines. It is feasible to suppose, however, that the higher speed machine could be controlled with smaller surfaces and would weigh less, which would result in a reduction of the total resistances, and in an accomplishment of higher speed for less power.



CORRESPONDENCE.

* * * The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.

Correspondents asking questions relating to articles which they have read in FLIGHT, would much facilitate our work of reference by giving the number of the letter.

SKIDS V. WHEELS.

[661] On the morning of Tuesday, July 12th, the Clerks of the Course prohibited the use of auxiliary starting apparatus in connection with the "alighting prize" at the Bournemouth International Aviation Meeting. I wish to question their right to do this, and also their wisdom, in order that such a prohibition may not occur at future meetings in England.

The Clerks of the Course are given practically unlimited power under the "General Regulations," and, in accordance with Article 8 thereof, they or the "Organisers," whoever they may be, may refuse any entry without assigning any reason. Under this regulation they could, therefore, refuse entries from owners of skid machines if they thought the skids would give an advantage over wheel machines in the "alighting" competition, and they would similarly be within their rights in refusing the entry of some particular monoplane for speed contests if they thought its speed qualities would give it an unfair advantage over the slower machines.

In spite, however, of the wide powers given to the Clerks of the Course, it is obvious that they must conduct the meeting in accordance with the regulations, and Article 2 provides that "any machine, without distinction of power, form, method of starting, or propulsion, is admitted under these rules." They cannot, therefore, make a rule to contradict this regulation; they cannot rule out all high-power machines from speed contests, or all machines having a particular method of starting from an alighting contest. To make such a rule on the very morning of the contest must surely be out of order.

Let us now consider the wisdom of such a prohibition. The object of each contest is to bring out the best points in the various machines. The speed contest is to show which machine can travel fastest, the height contest which can rise to the greatest altitude, and the alighting prize which can land nearest to a given spot. It nullifies the whole object of an alighting competition to exclude machines fitted with any particular starting or landing apparatus. If such means are not of advantage they will become obsolete by non-use, whilst if they have advantages of safety or accuracy then they should be encouraged and allowed to illustrate their merits in competitions requiring these particular qualifications. And I contend that these skid-machines have peculiar merits over machines using wheels for landing. They enable a machine to land across a ditch or on rough ground which would cause the general wreck of the machine fitted with wheels capable of catching on the ground. Moreover, a machine fitted with skids cannot run on uncontrolled, to the general danger, when landing, and this quality enables a skid-machine to land with the wind as well as against it.

I sincerely trust that the Clerks of the Course at future meetings will give grave consideration to suggestions limiting how machines must be constructed or started, because in taking on themselves such technical duties they must also accept serious responsibility.

New York, July 23rd.

GRIFFITH BREWER.

PENDULUM CONTROL.

[662] Referring to a correspondent's letter, No. 640 in FLIGHT, I have been working out the idea contained in Mr. Laurence Nunn's letter since October last, after I had been to the Doncaster Meeting—that is the idea of making the aviator himself part of the controlling pendulum—and I have almost completed a model (scale 1 in. to 1 ft.) illustrating this form of control.

I have carried out this idea much further than Mr. Nunn, in that by a special device my pendulum has two independent swings,

viz., back to front and sideways—both swings are entirely distinct and do not interfere with each other's work in any way—the former controlling the elevator, and the latter controlling the warping or the lateral stability of the planes.

The elevator, together with the helm, is further controlled by means of a hand-wheel fitted alongside the aviator's seat at the foot of the pendulum. This hand control of the elevator is superimposed on to the auto-control, and does not clash with it. Therefore for one of the three controls:—

1. The elevator is controlled automatically and by hand.
2. The lateral stability automatically only.
3. The helm by hand only.

Having worked out this idea and built the model, I am naturally very disappointed to read your remarks which were appended to Mr. Nunn's letter.

I had hoped that the opposition pull on the pendulum would make the pendulum "dead-beat" and stop any oscillation effect.

Although I have been a constant reader of FLIGHT almost since its commencement, I do not remember seeing the idea of "seating the aviator on the pendulum" having previously been suggested in your paper. I should be very much obliged if you will tell me whether you think it would be worth while completing my model; I have already spent most of my pocket-money over it.

Grimsby. T. H. WINTRINGHAM.

[By all means finish the model; if it is properly made it should teach much. The pendulum control ought to be successful up to a point, and experience with a well-made model will help to demonstrate where the practical disadvantages of the system come in. As the idea is one that is certain to be frequently "invented," experience of this sort is invaluable to all pioneers.—ED.]

[663] Your correspondent, Mr. H. L. Nunn (640), shows a very good idea for self-balancing aeroplanes and models. I have two models constructed on that principle, with the addition that it also acts fore and aft, as well as sideways. My models have been made for some time.

Dulwich. R. SHAPLAND.

[664] In reply to your correspondent (60) (p. 587), H. Laurence Nunn, I beg to say I am the inventor and patentee of an aeroplane with an automatic balance-plane fitted to the main supports and beneath the main top plane of my machine, which does away with warping. My machine is also fitted with side-fans, which prevent the machine from falling suddenly to earth should the engine stop in mid-air. I consider my invention to be an advance on any machine now in use. I have studied aerial flight for a great number of years and made several models, but unfortunately I have not been in a position to build a full-size machine. If Mr. Nunn would like to come and see my model I shall be pleased to show it to him any time by appointment.

6, St. Paul's Road, St. Leonards-on-Sea. GEORGE MARTIN.

SILVER-PLATED ALUMINIUM.

[665] I note that in your July 23rd issue Mr. W. Langdon-Davies (No. 644) suggests that aluminium for model-making, &c., should be silver-plated to facilitate soldering. The plating of this metal offers an interesting problem, which, to the best of my belief, remains unsolved. Electro-deposited metals refuse to adhere to an aluminum surface, sooner or later stripping off bodily or in patches. This characteristic is so marked that it is made use of in several processes where the removal of the deposit from the cathode surface is desired. The formation of a thin film of oxide, invisible even on a highly polished surface of the metal, probably accounts for the phenomenon. Of course, no end of formulae are given for plating aluminium, but I have never found one that was satisfactory. Subsequent heating of the plated aluminium has not given good

results. If any of your readers have succeeded in overcoming the difficulty, I, for one, should be very interested to hear how success was attained.

South Harrow.

Oswald H. Evans.

[666] I would like to inform your readers who may be using magnesium or aluminium for their models, that presuming either of the metals could be coppered or silver-plated, the joint, if made with ordinary tinman's solder would not stand, as galvanic action would break it.

There are several good solders on the market that will tin and solder aluminium, but even with the right solder there is a right way to use it.

Having studied the matter for years, I have discovered a new solder, and would be pleased to instruct any of your readers how to use it.

16, Tollington Road, Holloway, N.

C. CRASTIN.

DIPPING EDGE AND UPPER SURFACE LIFT.

[667] I have been a regular reader of your valuable paper for the past nine months, and have read with great interest the discussions on the value of the dipping edge and the lifting value of the upper surface of an aeroplane. I do not quite agree with the theories expounded by the several experts, and I should be very much obliged if you could find room in your paper for my opinion on the subject.

The upper surface lift of an aeroplane can neither increase the lifting value or speed of an aeroplane, because lifting effect of the upper surface depends entirely upon the speed of fall, which likewise is a measure of the tendency to create a vacuum or lifting effect. In relation to the air, an aeroplane in flight is really falling, so that the greater the area of planes, the less the rate of fall. The aeroplane with the least fall must be the best for both lift and speed.

Take two aeroplanes of the same weight, one with planes twice the size of the other; the one with the smaller area will fall at twice the speed of the larger, and will need to climb twice as far in a given distance of flight.

Whatever the speed of an aeroplane, it only has one speed of fall, which depends entirely on the area of the planes and their ability to prevent slip.

The fall of an aeroplane creates a pressure under planes, and if the air current can be prevented from leaking over the sides, and is compelled to pass under the planes, the effect will be the same as a parachute, and the fall lessened. Any attempt at dipping the leading or trailing edges must certainly block the air-passage, and therefore decrease the speed, compel a steeper climb, and create a vacuum or lifting effect which is really a pull from above and behind.

Hampstead Road.

G. H. KING.

STEERING CONTROL.

[668] May I be allowed to draw attention to letter 600, page 535, July 9th, 1910, re Steering Control.

I agree with two movements of the apparatus, but I differ in one, viz., the tiller movement. I fail to see how the above movement is to be performed along the quadrant rest only when the pin passing through universal joint, N, is perpendicular to plane of quadrant, namely, at right-angles to position shown. I hold that every movement should be possible without having to alter the other positions, as would have to be in the present case for instance, supposing it was required to move the ailerons at the moment it was in position shown, how could it be accomplished without first revolving wheel half a turn, thereby altering position of vertical rudder for horizontal steering? I think it would be a very awkward position to be in, as horizontal and ailerons have to be moved simultaneously.

I should suggest that N be dispensed with, and the tiller movement obtained by allowing the supports P and M moving about a centre below and midway between same. It would not alter any of the other movements, and be much safer.

Birmingham.

J. T. EDWARDS.

STRENGTH OF MONOPLANES.

[669] Mr. Macie points out in an article of great interest, evidently thinking of the unfortunate Wachter and his Antoinette, that monoplanes are not made sufficiently strong to withstand head resistance. One would think, however, that Hauvette-Michelin's awful end had proved the strength of the Antoinette in this respect.

O. D. A.

MODELS.

A MODEL CLUB FOR ASHFORD.

[670] Will those gentlemen who take any interest in models kindly send me their addresses. I am rather keen on forming a model club for Ashford and district, and when I know how many we are likely to get I shall send you particulars. I am a possessor of five models, four of which are home-made, and the other a Clarke "one oucer," from which I have had great flights, apparently beating Mr. Clarke's own record of 600 ft.

The College, Wye, Kent.

H. HELBAURY.

P.S.—What machine was Mr. Rolls using when he was killed, a French Wright or a Short-Wright?

[Mr. Rolls' machine was a French Wright.—ED.]

A CLEVER MODEL EXHIBIT.

[671] I am enclosing you a picture of a model that I made for the Fairfield Cycle Carnival for which I received second prize.



The dimensions are 10 ft. from the front to the tail, span of wings, 8 ft. 6 ins., width, 3 ft. The propeller is mounted on a cycle hub, which was free for the wind to drive, the tail and rudder being worked from a wheel by the seat. I am standing between the wing and the tail with my son in the seat. You will note a FLIGHT frontispiece of Blériot.

The accompanying picture may be useful to your young readers for the same purpose, and the cost to make is very small.

I hope to send you a picture of an actual biplane in the course of a week or two similar to Farman's latest. Span of upper planes, 26 ft., lower plane, 21 ft., width, 4 ft. 6 ins. This will be called the "Sawhuttle No. 2"; the first one came to grief in gliding.

Buxton.

A. R. ELLIS.

MANCHESTER MODEL CLUB.

[672] I am writing to ask you if you would ask in your valuable paper if there are any who would be willing to form a model club in this place, and if so would they kindly communicate with me, when a meeting could be arranged, for I feel sure that there are others who are making models and are interested in the science, and if a club could be formed we could have a small workshop where models could be made by the members themselves.

Trusting you will do me this favour, and thanking you in anticipation, also for the extremely interesting paper you publish each week.

4, The Polygon, Eccles, Manchester.

J. C. WHITTAKER.

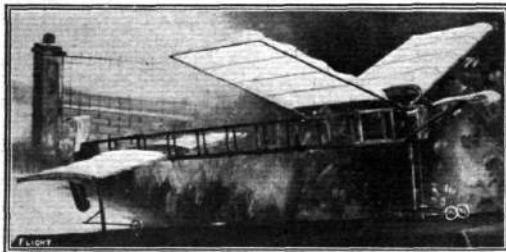
BLÉRIOT MODEL.

[673] As a reader of your weekly paper, I beg to enclose photo of my model monoplane, which I have just completed.

It is built on the Blériot type, and the following are the full

dimensions : total length, 4 ft. ; breadth of main planes, 4½ ft. ; height of machine, 1 ft. 2 ins. The front planes are made of thin maple framework, covered on both sides with fine muslin.

These are fastened to the body of the machine by means of small screws and nuts, so that the whole thing can be taken to pieces for removal. In the case of the back planes, these are made in the



same way, with the exception of shape and size. The wheels seen on the photo are 1½ in. in diameter, and are fitted on runners with springs to counteract the shock on alighting.

Referring to the propeller, I may add here that the shape of the one on the photo is incorrect, as this was only made out of one thin piece of aluminium, and was bent into the shape shown by error.

Forty or fifty strands of 1/16 in. square elastic is the driving power used, and when fitted together the whole machine weighs just 1½ lbs.

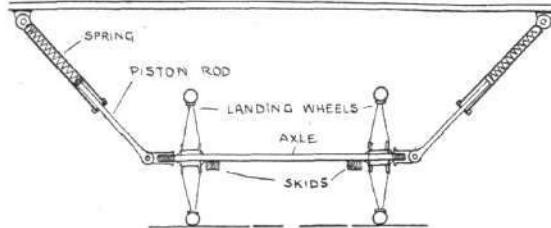
Trusting this will be of interest to your readers, who will, I hope, criticise my work.

Beeston.

TED WEST.

SPRING CHASSIS.

[674] On p. 564 Mr. Henderson wants to know how to build up the planes of a model biplane. If he will look up FLIGHT of last year, November 13th, the suggestion I sent up will be found suitable.



I have enclosed a rough sketch of spring frame for either models or full-size aeroplanes, trusting it may be of some use to readers of FLIGHT.

Wandsworth.

WALTER YEATMAN.

MODEL FARMAN.

[675] I am about to construct a model Farman according to the drawings in FLIGHT for October 16th, 1909, and should like to know whether I could fit an elastic motor.

Bournemouth.

[There have been several models of this type constructed to use elastic motors.—ED.]



RECORDS.

Distance and Duration.—Olieslaegers (Belgium), at Rheims, on a Blériot monoplane with Gnome engine : 244·309 miles in 5h. 3m. 5½s.

Speed.—Morane (France), at Rheims, on a Blériot monoplane with Gnome engine : 10 kiloms. (6·21 miles) in 5 mins. 42½ secs. = 65·02 m.p.h.

Altitude.—Brookins (America), at Atlantic City, on a Wright biplane : 6,175 ft. in 56 mins.



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Aeronautical Patents Published.

Applied for in 1909.

Published August 4th, 1910.

- 13,853. J. HUMPHRIES. Aerial machines.
16,494. E. J. BULL. Flying machines.
19,824. SOC. ANON. "ASTRA." Airship propulsion.

Applied for in 1910.

Published August 4th, 1910.

- 2,555. L. A. FISH. Airships.
7,587. R. C. GORE. Flying machine.

DIARY OF FORTHCOMING EVENTS.

British Events.

1910.
Aug. 6-13. Lanark.*
Aug. 15-20. Blackpool.
Aug. 29-30. Dublin.

1910.
Sept. 1-3. Folkestone.
Sept. 8-10. Northumberland and Durham.

Foreign Events.

1910.
Aug. 6-21. Circuit de l'Est (*Mazin*).
Aug. 25-Sept. 4. Havre-Trouville.*
Sept. 24-Oct. 3. Milan.*
Sept. 25-Oct. 3. Biarritz.

1910.
Oct. 15-23. New York. Gordon-Bennett Aviation Cup.
Oct. 18-25. St. Louis. Gordon-Bennett Balloon Race.
Dec. 4-18. Marseilles.

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